FOREST PEST CONDITIONS IN CALIFORNIA – 1991

A Publication of the California Forest Pest Council

THE CALIFORNIA FOREST PEST COUNCIL (formerly the California Forest Pest Control Action Council) was founded in 1951. Membership is open to public and private forest managers, foresters, silviculturists, entomologists, pathologists, zoologists, and others interested in the protection of forests from damage caused by animals, diseases, insects, and weeds. The council's objective is to establish, maintain, and improve communication among individuals -- managers, administrators, and researchers -- who are concerned with these issues. This objective is accomplished by four actions:

1. Coordination of detection, reporting, and compilation of pest damage information.

2. Evaluation of pest conditions.

3. Pest control recommendations made to forest managing agencies and landowners.

4. Review of policy, legal, and research aspects of forest pest control, and submission of recommendations thereon to appropriate authorities.

The California Board of Forestry recognizes the Council as an advisory body in forest pest protection. The Council is a participating member in the Western Forest Pest Committee of the Western Forestry and Conservation Association.

The report, **FOREST PEST CONDITIONS IN CALIFORNIA - 1991**, is compiled for public and private forest land managers to keep them informed of pest conditions on forested land in California, and as an historical record of pest trends and occurrences. The report is based largely on information provided by four sources: (1) the state-wide Cooperative Forest Pest Survey, in which federal, state, and private foresters and land managers participate, (2) information generated by Forest Pest Management, Pacific Southwest Region, USDA-Forest Service, while making formal detection surveys and biological evaluations, (3) reports and surveys of conditions on private lands provided by personnel of the California Department of Forestry and Fire Protection, and (4) surveys and detections of the California Department of Food and Agriculture.

This report was prepared by the U.S. Forest Service in cooperation with other member organizations of the Council. It was duplicated and distributed by the California Department of Forestry and Fire Protection.

Cover: The health of California's forest resource is affected not only by native insects and diseases (represented by the bark beetles shown on the cover), but also is threatened by the introduction of exotic insects and diseases (represented by the Asian gypsy moth, see p. 11). Quarantines of potentially harmful pests are established by the California Department of Food and Agriculture to maintain the health of California's agricultural and forest resource base.

Sacramento February 28, 1992

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HIGHLIGHTS OF PEST CONDITIONS - 1991

STATUS OF INSECTS.

As the drought continued into the sixth year, the amount of tree mortality from attacks by bark beetles appeared to be static or decreasing in the southern Cascade Mountains and in the northern Sierra Nevada Mountains. Several districts reported that salvage of tree mortality was down because newly faded trees were not as common as in past years. On the other hand, the amount of tree mortality connected with attacks by roundheaded and flatheaded borers was reported as increasing in 1991. And for the first time in at least a decade, the spruce beetle was reported as responsible for mortality of Sitka spruce in California.

Mortality levels in the southern Sierra Nevada Mountains varied by report, but the overall consensus was that mortality appeared to increase from 1990 in pine, mixed conifer, and fir types. Losses in some Southern California pine forests continued to severely deteriorate stand structure.

Defoliating insects, such as the Douglas-fir tussock moth and the spruce budworm, continued to exist at population levels that were endemic or caused damage that could not be easily detected. Gypsy moth trap catches were even lower than in 1990. However, efforts by the Caliornia Department of Food and Agriculture and APHIS to detect gypsy moth were increased in late 1991 because of the real possibility of introduction of the Asian "strain" of the gypsy moth near international shipping ports. Several infested ships from western Russian ports were reported by Agriculture Canada and the Oregon Department of Agriculture. Four Asian gypsy moths were confirmed from traps in the state of Washington and an egg mass was found on a Russian ship prior to its arrival at the Port of San Francisco.

Aphids, scales and psyllids appeared to be more abundant and damaging during 1991 than in recent years. A new introduction affecting urban eucalyptus and the commercial nursery industry was identified as the blue gum psyllid.

STATUS OF DISEASES.

Abiotic factors continued to be a major influence on wildland vegetation in California. Moisture stress caused by the current drought made trees susceptible to attack by root disease, bark beetles and other cambium borers, and to debilitation from mistletoe infections. Cold temperatures in December 1990 and January 1991 led to considerable dieback of trees and woody shrubs in much of California. Species most affected were eucalyptus, manzanita, ceanothus, and coast live oak.

Pitch canker caused by Fusarium subglutinans continued to flag Monterey pine in Santa Cruz and Alameda Counties. The disease has spread northward along Highway 1 to approximately two miles past the city limits of Santa Cruz.

Incidence of Dutch elm disease increased by 25% in 1991. Two hundred and ninety-four trees were confirmed positive for the causal pathogen, Ceratocystis ulmi, as of November 1, 1991. Areas of detection include Walnut Creek,

Martinez, Oakland, San Jose, Ross, Larkspur, San Anselmo, Petaluma, Atherton, Woodside, and Redwood City. Seven infected elms were found in Sacramento County, where Dutch elm disease was first found in 1990.

STATUS OF WEEDS.

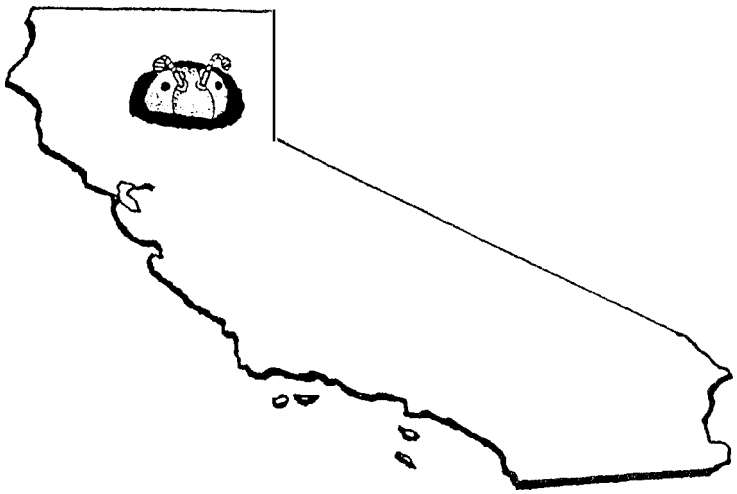
Drought continued to exacerbate vegetative competition in much of California and impede reforestation efforts. The use of herbicide treatments for reduction of vegetative competition resumed on a limited scale on National Forest System lands.

STATUS OF ANIMAL DAMAGE.

Reports of damage from a variety of mammal species were received from 36 counties representing 75% of the land area of California. Injuries from feeding by deer, pocket gophers, and livestock occurred on trees throughout the state on most ownerships. Damage by porcupines, rabbits and hares, black bears, and other species tended to be more limited geographically. No damage was reported for birds or small seed-eating mammals.

STATUS AND CONTROL OF INSECTS

A Report to the California Forest Pest Council from the Insect Committee



Don Owen, Chair
John W. Dale, Secretary

Edited by John W. Dale
December 30, 1991

STATUS AND CONTROL OF INSECTS

WESTERN PINE BEETLE, Dendroctonus brevicomis.

North Coast. Incidence of ponderosa pine mortality decreased from recent years in most areas. Scattered mortality still occurred in Lake, Napa, Mendocino, and Trinity Counties.

Northern. Mortality caused by the western pine beetle on Federal lands in northwestern California did not appear to be as high as in 1990. For example, only scattered mortality was seen in northern Trinity County with one mortality group of 30-40 pines near Coffee Creek Guard Station. Late spring rains and a relatively cool summer were probably responsible for some of the mortality reduction. Some large diameter pines were infested in the North Warner Mountains and across the Devil's Garden Ranger District, Modoc National Forest (Modoc County). This district began the salvage sale process for about 3.5 MMBF of ponderosa pine. Pine mortality on state or private lands was generally scattered and no serious outbreaks were reported.

Sierra. Scattered, small (3 to 10 trees) group kills associated with the western pine beetle were noted throughout lower to mid-elevation westside pine and mixed conifer stands. Areas of particularly evident activity include Breckenridge Mountain and the Davis Spotted Owl Habitat Area on the Greenhorn Ranger District (Sequoia National Forest), parts of the South Landing Salvage Sale (Groveland Ranger District) and the vicinity of Wrights Creek (Mi-Wok Ranger District), both on the Stanislaus National Forest. Above-normal pine mortality also showed up in late August and September in the vicinity of the Twain Harte Basin and Confidence Ridge (Tuolumne County).

Individual ponderosa pines as well as groups up to 10 acres in size were killed on the Mountain Home Demonstration State Forest. Mortality from all factors was estimated to exceed growth over the entire forest. Mortality of ponderosa pine on state and private lands increased markedly in Madera and Mariposa Counties in 1991. Thus, the worst effects of the drought seem to have shifted southward from El Dorado, Amador, Calaveras and Tuolumne Counties.

Southern California. Mortality of Coulter pine continued at a high level in San Diego and Riverside Counties in Southern California. Large group kills created by bark beetles began to be seen at lower elevations in landscape settings.

PINE ENGRAVER BEETLES, Ips spp.

North Coast. As with the western pine beetle, pine engraver activity decreased in many areas throughout the region, except for late summer attacks in Lake County. Pine engravers continued to attack Monterey pines stressed by pitch canker infections in Alameda County (city of Hayward) and Santa Cruz County (several areas). Other San Francisco Bay Area communities had pine engravers attack ornamental pines apparently stressed by watering restrictions.

Northern. Mortality and top-killing of ponderosa pines by pine engravers generally were not as common this year as in 1990. A few groups of freshly top-killed pines were observed in the spring near Mendocino Pass, Mendocino

County. Late spring snows near Horse Mountain, Lake County, broke the tops from plantation ponderosa pines in the old Round Burn. These tops were heavily infested by pine engravers, but mortality of standing trees had not occurred in these plantations by early fall. The ample supply of broken and topless trees in the plantations may have been sufficient to absorb the brood on emergence. Pine engravers breeding in slash created by a fire control line of August 1990 caused ponderosa pine mortality in the vicinity of Manton/Forward Road and Ponderosa Way, Tehama County.

Pine engraver beetles were involved in killing isolated, older knobcone pine, as well as small groups. Knobcone pine mortality was detected at the Whiskeytown National Recreation Area, Shasta County, and at Lake Siskiyou and McCloud Flats, Siskiyou County. The pine engraver beetles involved in knobcone pine mortality at Lake Siskiyou were identified as Ips mexicanus. Other agents or factors common in the knobcone pine mortality included the red turpentine beetle (Dendroctonus valens), the California flatheaded borer (Melanophila californica), old age, and dense stocking.

Sierra. Pine engraver activity continued throughout much of the pine and mixed conifer stands on the westside of the Sierra Nevada Mountains. Attacks usually were in association with activity by the western pine beetle and the mountain pine beetle. On the eastside, top-kills from pine engravers were noted in Jeffrey pines near Mammoth Lakes and Smokey Bear Flat on the Inyo National Forest.

Southern California. Ips confusus was frequently found attacking singleleaf pinyon, Pinus monophylla, in San Bernardino and Tulare Counties. Particularly susceptible to attack were pinyons with black stain root disease.

FIR ENGRAVER, Scolytus ventralis.

North Coast. Scattered mortality of white fir occurred in portions of Mendocino, Lake, and Humboldt Counties. Incidence was about the same as in 1990.

Northern. Mortality caused by drought stress and attacks by the fir engraver were noticeably high in white fir growing on eastside pine sites from southern Lassen County to Lake Tahoe. Areas where white fir mortality was visibly high include Herd Peak, Goosenest Mountain, Rainbow Well and Tamarack Flat in Siskiyou County, and the Thousand Lakes Wilderness and Sugarloaf Mountain in Shasta County.

Aerial flights by personnel of the California Department of Forestry and Fire Protection indicated that most mortality occurred in high elevation true fir stands, and concentrations of this type of mortality were noted at a number of locations in Siskiyou County:

Vicinity of Scott Valley --
- west slope of Scarface Ridge (large groups),
- Soap Creek drainage (light, widely scattered),
- east slope of Etna Mountain and mountains immediately to the south (large groups of red fir with many living trees showing excessive branch morality in the lower crown).

Northeast of Mount Shasta --
- south slope of Rainbow Mountain (large group),
- pass between Ash Creek Butte and Dry Creek Peak (scattered & grouped),
- west side of Butte Creek Valley (large group of white fir; low elevation relative to other true fir mortality noted).

Also surveyed were portions of the Goosenest area, McCloud Flats, Medicine Lake Highlands, Hilt Basin, and the west side of the I-5 corridor south to The Eddys. Mortality in these areas was generally less than expected. Southward along the more mesic sites west of the Sacramento River, true fir mortality from all causes was less apparent than in 1990.

Because true fir mortality detected in the spring and early summer of 1991 represented fir engraver activity in 1990, it was not necessarily an accurate representation of beetle activity in 1991. The roundheaded fir borer, Tetropium abietis, and the fir flatheaded borer, Melanophila drummondi, are often associated with the fir engraver and appeared responsible for tree mortality in some instances.

Aerial surveys indicated that major centers of mortality in white fir were absent on the Modoc National Forest. Most of the mortality occurred in scattered areas, and scattered groups of pole-size firs were top-killed. The top-killing did not appear to be greater than levels prior to the current drought.

Sierra. Although overall true fir mortality appeared to be less than 1989-1990 levels, fir engraver continued to be evident in the Lake Tahoe Area, on the eastside of the Sierra on the Inyo National Forest between Mammoth Lakes and Lee Vining, and on Breckenridge Mountain (Sequoia National Forest). The roundheaded fir borer, Tetropium abietis, and the ambrosia beetle, Platypus wilsoni, were frequently found attacking the lower bole of firs attacked along the upper bole by the fir engraver.

True fir mortality was extensive around the north end of the Lake Tahoe Basin. Large groups of fading firs were observed in the upper West Martis Creek drainage and along the ridgeline northeast of Brockway Summit. Inspection of trees at the Northstar Resort revealed that the majority firs with lethal attacks had not faded by March.

White firs up to 30 inches dbh were killed on the Mountain Home Demonstration State Forest (Tulare County). These occurred in scattered small groups. Mortality of white fir was low but increasing in Fresno County.

Southern California. The fir engraver was involved in the fir mortality that occurred on Mt. Palomar in San Diego County. White fir is a minor component of the forest on Mt. Palomar, but it contributes habitat diversity.

RED TURPENTINE BEETLE, Dendroctonus valens.

North Coast. Several Monterey pines with pitch canker disease were killed by red turpentine beetles in Santa Cruz and Alameda Counties. In addition, other drought-stressed Monterey pines throughout the region were killed by this beetle.

Northern. The red turpentine beetle was involved in most of the pine mortality examined in 1991. This included ponderosa, Jeffrey, sugar, western white, and knobcone pines. In most cases, the trees did not have enough pitch to produce a pitch tube, and the only sign of attack was dry granular frass. A few trees were so dry that only red boring dust was produced from the point of attack.

Sierra. Red turpentine beetle attacks continued to be common on both sugar and ponderosa pines throughout the westside Sierra Nevada. Sugar pine seemed to be attacked more frequently with most attacks concentrated in the basal part of the tree between the root collar and 30 to 50 cm above the soil line. In 1989 and 1990, red turpentine beetle attacks were frequently seen above 1.5 m, which is a good indicator of severe tree stress.

MOUNTAIN PINE BEETLE, Dendroctonus ponderosae.

Northern. Total tree mortality attributable to attacks by the mountain pine beetle was comparable to that of 1990. The number of sugar pine killed by early fall appeared to be lower, although not all attacked trees had faded by that time, and additional attacks could still occur. The nine sugar pines on the Mendocino National Forest that have been identified as being resistant to white pine blister rust were treated with carbaryl insecticide to prevent successful attacks by the mountain pine beetle. Candidate rust resistant sugar pines on Latour Demonstration State Forests also were treated with carbaryl. Western white pines killed by various combinations of drought stress, white pine blister rust, dwarf mistletoe infections, and mountain pine beetle attacks were more common than last year at higher elevations in Del Norte and Humboldt Counties. Ponderosa pines infested with mountain pine beetle were not abundant, but were more commonly encountered in both the Coast Range and in the southern Cascades than in previous years. The California flatheaded borer, Melanophila californica, was a common associate in ponderosa pines infested by the mountain pine beetle. Mortality of lodgepole pine occurred in Lassen National Park and in the Thousand Lakes Wilderness (Lassen National Forest).

Sierra. Mortality of sugar pine caused by mountain pine beetle was reported from scattered locations throughout the westside of the Sierra Nevada. On the Mountain Home Demonstration State Forest, individual and groups of pole-size and older sugar pine were killed. Group kills were up to half-acre in size. As at Latour, candidate rust resistant sugar pines at Mountain Home were treated with carbaryl to prevent successful beetle attacks. Mortality in Madera and Mariposa Counties generally occurred as scattered, single sugar pines.

DOUGLAS-FIR BEETLE, Dendroctonus pseudotsugae.

North Coast. Incidence of standing tree mortality appeared to decrease from the past two years. Attacks on scattered windthrow in Mendocino County were noted.

Northern. A few widely scattered and infested Douglas-firs were detected along the upper part of the South Fork of the Sacramento River, Siskiyou County. All were old growth trees that had severe dwarf mistletoe infections, and some had older dead spike tops. Older Douglas-fir mortality scattered in

the river canyon suggest that a stable, low level Douglas-fir beetle population has been present for years.

JEFFREY PINE BEETLE, Dendroctonus jeffreyi.

Northern. Jeffrey pine mortality caused by Jeffrey pine beetle was common between Butte Lake and Snag Lake inside Lassen National Park, and also along the trail from the Tamarack trailhead to Lake Eiler in the Thousand Lakes Wilderness (Lassen National Forest). Both single trees and group kills were involved. This was part of mortality occurring over a widespread area of mixed conifer type where mountain pine beetle was killing lodgepole pine and the roundheaded fir borer was attacking red fir. Contributing factors to the mortality include old age, the continuing drought, and heavy levels of dwarf mistletoe infection. Jeffrey pine beetle attacks were common on trees infected with black stain root disease near Williams Reservoir, south of Adin, Lassen County.

Sierra. Jeffrey pine mortality was negligible around the north end of the Lake Tahoe Basin.

Southern California. There was scattered Jeffrey pine mortality associated with this beetle in the San Bernardino Mountains. The prolonged drought contributed to the mortality.

SPRUCE BEETLE, Dendroctonus rufipennis.

North Coast. A group of over 40 Sitka spruce was killed by spruce beetles near Patrick's Point State Park in Humboldt County. Armillaria root disease was found at the base of many of these trees, but areas of infection lacked signs that the trees were initially succumbing to the disease prior to spruce beetle attack.

ROUNDHEADED FIR BORER, Tetropium abietis.

Northern. Many red fir trees faded during 1991 at higher elevations in Lassen National Park, and in the Thousand Lakes Wilderness (Lassen National Forest). The boles of the current red fir mortality were occupied by the roundheaded fir borer, and the tops of inspected trees were infested by the fir engraver. Drought stress, old age, and numerous dwarf mistletoe infections all appeared to have played a role in the mortality.

FIR FLATHEADED BORER, Melanophila drummondi.

North Coast. This borer attacked hundreds of Douglas-firs in southwestern Trinity, southeastern Humboldt, and northeastern Mendocino Counties. Stress from drought, Armillaria and blackstain root diseases, or a combination of these contributed to the success of the attacks and consequent mortality. Incidence elsewhere in the North Coastal Region appears static compared to the last few years, but mortality that can be attributed to drought and the fir flatheaded borer likely will become more evident over the next year or two. Numerous Douglas-fir trees in the Coast Range from Lake County north to Del Norte County have drops, or small streamers, of clear resin on their boles.

Removal of a piece of bark from trees showing these symptoms usually reveals an infestation of incipient larvae of this borer.

Northern. The number of Douglas-fir that died during 1991 after being infested by the fir flatheaded borer was similar to 1990.

CALIFORNIA FLATHEADED BORER, Melanophila californica.

Northern. Freshly fading single trees and small groups of ponderosa pine were common on most of McCloud Flats, Siskiyou County. In many cases, the only beetles detected in these trees were the California flatheaded borer and red turpentine beetle. Mortality was common in trees growing on lava outcrops, and some mortality groups involved lightning strikes.

CEDAR BARK BEETLES, Phloeosinus spp.

Northern. At a site west of Weed, Siskiyou County, mortality of understory incense-cedar was attributed to drought and a lowered water table, although Phloeosinus spp. had successfully colonized the trees. The stand was overstocked and had a ponderosa pine overstory.

Increased mortality of Port-Orford-cedar was observed in northwestern California, but levels appeared to be related to the continuing drought and attacks by cedar bark beetles and wood borers (see amethyst cedar borer).

Sierra. Incense-cedar mortality has been reported over the last 3 to 5 years from the Lake Tahoe Basin and locations throughout the westside of the Sierra Nevada Mountains, including Oakhurst (Mariposa Ranger District, Sierra National Forest) and the Tule River Ranger District (Sequoia National Forest). Cedar bark beetles were often associated with mortality, but were considered secondary. Causes of the recent cedar dieback have not been completely identified.

Southern California. Cedar bark beetles were a major factor in causing group-kills of incense-cedar in San Diego County.

AMETHYST CEDAR BORER, Semanotus amethystinus.

Northern. Several groups of dead incense-cedar that had been infested by the amethyst cedar borer were detected south of Lava Beds National Monument, near Lava Camp and Cougar Butte, Siskiyou County. Personnel from the Klamath and Modoc National Forests were initially concerned about the mortality because the presence of incense-cedar contributes greatly to the biological diversity of the area. Mosts of the mortality could be attributed to extreme drought conditions affecting trees growing on soils that have very low water holding capacity. Other factors which may have contributed to the deaths of certain individual trees included competition for water with antelope bitterbrush and several other species of brush, old age, numerous true mistletoe infections, and attacks in the tops and limbs by cedar bark beetles, Phloeosinus spp.

The amethyst cedar borer was found infesting dead Port-Orford-cedar that had been stressed by mechanical damage and altered water tables near Dillon Creek, Siskiyou County, and the upper Trinity River, Trinity County. Numerous trees

infected with Port-Orford-cedar root disease in the Smith River drainage, Del Norte County, also were infested by the amethyst cedar borer.

OAK BARK BEETLES, Pseudopityophthorus spp.

Northern. Increased activity of oak bark beetles occurred in the Redding area during August and September. Numerous reports of unsuccessful attacks on interior live oak, Quercus wislizenii, were received. Some of the activity was related to the cutting of live trees, but much of the activity remained unexplained. Attacks on black oak (Q. kelloggii) in the town of Paradise (Butte County) were related to construction injury to the trees.

SCARAB BEETLES, Hoplia dispar and Serica anthracina.

These beetles caused light to severe damage to Douglas-fir seedlings at the Foresthill Breeding Orchard, Tahoe National Forest (Placer County). Removal of competing vegetation apparently converted the seedlings into a primary food source.

EUCALYPTUS LONGHORNED BORER, Phoracantha semipunctata.

North Coast. The acreage supporting infested trees increased on the Stanford University campus in Palo Alto, San Mateo County.

DOUGLAS-FIR TUSSOCK MOTH, Orgyia pseudotsugata.

Northern. The 1991 data from the Douglas-fir tussock moth early warning system verified that populations throughout California remained at low, non-damaging levels, with the exception of those on the Big Valley Ranger District, Modoc National Forest. For the second consecutive year there was a trend toward increasing trap catches on the Big Valley Ranger District. This area is located in the extreme northeastern corner of California, which is the closest area in California to the current tussock moth outbreaks occurring in eastern Oregon and Idaho. Larval populations on the Big Valley District will be monitored in the spring of 1992.

TENT CATERPILLAR, Malacosoma sp.

Sierra. Although tent caterpillar populations continued at very low levels throughout the Mono-Mammoth Area, fairly extensive areas of dieback of antelope bitterbrush (Purshia tridentata) were reported in 1991 on the Mono Lake Ranger District, Inyo National Forest. Specific areas affected include about 100 acres near Baxter Spring on the Dexter Grazing Allotment, and approximately 500 to 700 acres near Mono Mills. Causes of the dieback have not been determined.

A CALIFORNIA SPRUCE BUDWORM, Choristoneura carnana californica.

Northern. For the sixth consecutive year, there was no visible defoliation of Douglas-fir by this budworm in Trinity County.

GYPSY MOTH, Lymantria dispar.

California. More than 20,000 delta traps were deployed and monitored to detect and delimit gypsy moth infestations in 1991. Six moths were trapped in four counties (Tables 1.1, 1.2), compared to 24 moths in eight counties in 1990. No moths were detected at either Tiburon, Marin County, or Folsom, Placer County, the two sites treated with dimilin in the spring of 1990. Based on two flight seasons of negative trapping (1990 and 1991), eradication has been achieved at both locations.

During 1991 a multiple moth catch occurred at Aptos, Santa Cruz County. Two moths were captured within a delimitation grid of 25 traps per square mile deployed in a four square mile area centered on a 1990 detection site. Canvassing of the area revealed a resident who had been camping in New York during the summer of 1989. An intensive survey of this resident's property resulted in the discovery of larval cast skins, three pupal cases, and a hatched egg mass. Since no viable egg masses were found at this site, and no evidence of infestation was found in adjacent properties, the Aptos find is being treated as an isolated incident and will be intensively trapped again in 1992.

The low numbers of moths detected in 1991 is the good news - now, the bad news. An egg mass of the Asian gypsy moth was present on a Russian ship docking at the Port of San Francisco. This ship had been inspected at a port of entry in Oregon before continuing on to San Francisco. The crew found the mass and voluntarily turned it over to inspectors upon arrival. Thus far there are no confirmed identifications of Asian gypsy moths in California other than this incident. However, it does point out the potential for introduction and trap densities around California ports have been increased to aid in detection.

The likelihood of the establishment of this moth in North America increases as trade with western Russia increases. Ships from western Russian ports have already been in the Great Lakes Waterway and up the Mississippi River. Seven Asian gypsy moths have been confirmed from traps in the state of Washington, and one from a trap near Portland, Oregon. Even though moths were trapped up to 12 miles inland from the nearest shipping channel, the probable source is a ship coming from a Siberian port. It has been proposed that data from Lloyds of London be used to track ships leaving western Russian ports during the moth flight period of June 15 to September 30 in order to anticipate what ships may be infested.

Once established, this "strain" of the gypsy moth could expand its range much more rapidly than the strain presently in eastern North America. While females of the eastern strain are flightless, females of the Asian gypsy moth are capable of flight up to 40 km (about 25 miles).

Oregon[a]. An extensive outbreak of the gypsy moth was detected in Lane County, Oregon in 1984. The location and size of this outbreak presented the greatest potential to date for the introduction and establishment of gypsy moth into California. Gypsy moths continue to be trapped in Oregon near the state

a. Submitted by Alan D. Mudge, Oregon Department of Agriculture, 635 Capitol St. NE, Salem, OR 97310-0110, November 6, 1991. Taken whole, or in part, from: Mudge, A. D. and Kathleen Johnson. 1991. Gypsy moth detection and eradication programs in Oregon. Unnumbered report, Oregon Dept. Agr. 4 p.

line between the two states. The frequency of dockings by ships from Siberian ports also presents the possibility of the introduction of the Asian gypsy moth along the Columbia River. For these reasons, Forest Pest Conditions in California will continue to report on the status of gypsy moth in Oregon.

TABLE 1.1. California Gypsy Moth Situation - 1991[b]

Years	Traps Placed	Adults Trapped	Counties	Properties with Viable Egg Masses/ Pupal Cases	Sites Treated
1984	30,000	25	9	2	5
1985	28,000	28	10	3	2
1986	27,000	20	9	1	0
1987	19,000	6	5	1	1
1988	20,000	13	6	0	0
1989	21,000	56	14	2	0
1990	21,000	24	8	0	1
1991	20,000+	7	5	1	0

b. As of October 1, 1991.

TABLE 1.2. Location of Gypsy Moths Caught in California in 1991

County	City
Los Angeles	Pasadena (1)[c]
Orange	San Juan Capistrano (1)
Santa Clara	Morgan Hill (1)
Santa Cruz	Aptos(2), Boulder Creek (1)
Yolo	Broderick (1)

c. () = Number of adult moths trapped.

Status at the end of the 1990 Season. "In 1990, approximately 16,335 traps were placed statewide. Nineteen gypsy moths were detected, all in western Oregon. Five moths were found in Lake Oswego (Clackamas County). Three old egg masses were subsequently found on a birdhouse moved with a family from Virginia in March of 1990 and are believed to be the source of the moths in the immediate area. Eleven residential properties were treated in May 1991 with two applications of Bacillus thuringiensis from the ground."

1991 Survey Program. "Approximately 15,445 traps were placed statewide in 1991. Early detection of new introductions continued to be the main focus of the detection program in order to keep eradication programs as small as possible. Traps were concentrated in western Oregon where most population centers and gypsy moth host material are located. However, all cities and towns statewide were considered at risk and trapped. The standard detection trap density was 1-4 traps per square mile. Special sites such as state and national parks, public and private campgrounds, and RV parks were also trapped. Delimitation traps were placed at densities of 16-49 traps per square mile for

four to nine or more square miles. They were placed to monitor sites where detections were made the previous year and to monitor the success of eradication programs. Mass-trapping densities of 3-9 traps per acre were used in the core of the eradication area to pinpoint as precisely as possible any surviving population. Delimitation traps were also placed as soon as possible following initial detections to delimit any new infestations the same year. The 15,445 traps were placed as follows: 12,332 detection traps, 2,074 delimitation traps, 198 mass-trapping traps, and 841 additional delimitation traps added in response to new detections."

Twenty-nine gypsy moths were detected in Oregon in 1991 (Table 1.3). All detections were again in western Oregon. Detections were made in 11 general areas, three of which are close to northern California -- Sam's Valley, Jackson County; Selma, Josephine County; and Cave Junction, Josephine County.

"The single detection in Lane County was in the vicinity of several single detections made in recent years, but is unlikely to be related to the over 19,000 moths detected in Lane County in 1984. No detections were made in Warrenton (Clatsop County), or Rogue River (Jackson County), where two moths were found last year at each site. Four other sites in the greater Portland area where single detections were made last year were also negative this year. No moths were found in the eradication area in Lake Oswego or in the adjacent area where three additional single moths were detected but not treated."

Table 1.3. Summary of 1991 Gypsy Moth Detections in Oregon

County	City/Area	No. Males Trapped	Trap Density per Sq. Mile
Clackamas	Lake Oswego	4	4-16 (increased)
Jackson	Sam's Valley	2	< 1
Josephine	Cave Junction	6	1-16 (increased)
	Selma	2	< 1 (increased)
Lane	Springfield	1	2 (increased)
Marion	Aurora	4	2 (increased)
Multnomah	Gresham	1	4 (increased)
	N. Portland	1	4
	S.W. Portland	5	4 (increased)
	S.E. Portland	2	4 (increased)
Washington	Tigard	1	4 (increased)
Statewide total		**29**	

Projected Eradication and Survey Programs in 1991. "Most detections made this year are likely to be the result of new introductions and not related to previous finds. The major exception to this may be the six moths detected in Cave Junction. These detections were in the vicinity of a single catch made

there in 1990. A move-in has been identified in the immediate area, but no egg masses have been found to date. Information gathering regarding recent move-ins from the northeastern U.S. and subsequent egg mass searching is underway at sites where multiple detections or clusters of single catches were made. This process has been initiated in Cave Junction, Selma, Sam's Valley, Aurora, Lake Oswego, and at one site in Portland. Eradication programs for 1992 would use the biological insecticide Bacillus thuringiensis (B.t.) applied from the ground, if possible. However, due to the topography and scattered detections in Cave Junction, any eradication program there would likely be an aerial spray program of B.t. over approximately one square mile."

Asian Gypsy Moth Detection Program. "Asian gypsy moth (AGM) poses a significant threat to Oregon's agriculture and natural resource base. Agriculture Canada has reported finding ships infested with AGM egg masses (some with ballooning larvae) in Vancouver, B.C. Because ships from Siberian ports have also visited Oregon ports, the Oregon Department of Agriculture increased their detection program in vulnerable areas. The department has also been assisting USDA-APHIS with ship inspections at Columbia River ports."

"The risk of introduction and establishment may not be limited to late March through May, normally when introduced gypsy moth eggs hatch in Oregon. AGM eggs on ships, not subject to their normal temperature patterns, may hatch at almost any time of year, if temperatures are appropriate. While most AGM eggs hatch the year following oviposition, some five to 25% of the eggs are reported to hatch the same season. Other eggs are reported to hatch after two years. Since all ports of entry in the Pacific Northwest were surrounded by susceptible host plants and temperatures can be relatively moderate in spring through fall, ships carrying live AGM egg masses may pose a significant risk for much of the year."

"Nine vessels identified as 'at-risk' for AGM have been inspected by USDA-APHIS and/or Oregon Department of Agriculture personnel in Columbia River ports for AGM egg masses. Egg masses were found on five of the ships. Egg mass numbers ranged from single egg masses found on two of the ships to approximately 12, 25 and 650 egg masses found on three others. Inspection of a ship is very difficult and time-consuming at best; all egg masses present are not expected to be found. On one ship several egg masses were observed beyond reach of the inspectors."

"In reponse to the threat of AGM introduction from infested ships, additional detection traps were placed in 1991 at one trap per mile along the Oregon Coast, and one to four traps per mile along the Columbia River. Additional traps were also placed around the port of Coos Bay and four grain terminals in Portland. Although no gypsy moths were caught in these additional traps, one suspect moth was trapped in part of the Portland detection grid near the confluence of the Willamette and Columbia rivers."

"Identification of moths is being made by Dr. Richard Harrison at Cornell University using a new procedure involving PCR enhancement of mitochondrial DNA. Asian gypsy moths appear to differ from North American gypsy moths in certain DNA base pairs. Oregon Department of Agriculture has submitted 26 of the gypsy moths caught in Oregon in 1991 and two caught in Warrenton (near the mouth of the Columbia River) in 1990 for determination using the mitochondrial DNA technique; prior to undergoing the mDNA technique, the wings of the moths will be examined using wing morphometric techniques at Otis Methods Development Laboratory."

"The Oregon Department of Agriculture is working with state and federal forestry and regulatory officials to identify the serious actions necessary to prevent the introduction of Asian gypsy moth, to detect and delimit any introduction, and to eradicate immediately any AGM infestations detected. Currently 'at-risk' ships are allowed to travel up the Columbia River prior to inspection at port. Larvae may balloon from egg masses onboard to the abundant host plants onshore as the ships travel up this waterway to port and dock. Unless procedures to minimize this threat are established, the threat of AGM introduction and establishment will remain significant."

Eastern United States. Estimates of defoliation in the East in 1991 totaled 3,822,000 acres - a reduction of 3,482,440. This may result in decreased detections of egg masses being transported into California on goods and loads from the eastern U.S.

A MINDARUS TWIG APHID, Mindarus sp.

Studies of suppression techniques applicable in beds of true fir seedlings continued into their last year at Placerville Nursery. An integrated pest management approach appears to have promise for reducing damage to acceptable levels. A study of the growth and survival of outplanted seedlings with variable amounts of feeding damage was initiated. Work continues on the identification of the aphid, which appears to be a new species.

CONIFER APHIDS, Cinara spp.

As part of an international effort to locate parasites of the cypress aphid, Cinara cupressi, collections of aphids were made from Cupressus bakeri on the Lassen National Forest in eastern Shasta County, and Cupressus macrocarpa in Golden Gate Park, San Francisco County. The cypress aphid is currently causing extensive timber losses in Kenya and seven other African nations. The International Institute of Biological Control is very interested in specimens of Cinara aphids from California, and additional collections from native California cypress and juniper species are anticipated in 1992.

SPRUCE APHID, Elatobium abietinum.

North Coast. Visible defoliation of Sitka spruce extended from Arcata, Humboldt County, to Crescent City, Del Norte County. Some spruce mortality is visible from U.S. Highway 101. Some observers consider damage to be greater than that of 1990. Both planted and natural Sitka spruce are affected.

A GELECHIID LEAF SKELETONIZER, Chionodes trichostola.

Northern. High population levels of first instar larvae were observed on blue oak in the northern Sacramento Valley, but significant damage never materialized. Blue oaks began shedding some of the more severely damaged leaves by early July, although drought stress and very hot weather were probably important causal factors. Only one year (1990) of significant defoliation occurred.

LODGEPOLE NEEDLEMINER, Coleotechnites milleri.

Needleminer population densities remained low over most of the historic outbreak areas of the Tuolumne-Merced watershed, Yosemite National Park. The exception was three plots near the west end of the study area that had high and rising populations. Visible defoliation should be expected to occur in these locations again in 1993.

CALIFORNIA OAKMOTH, Phryganidia californica.

North Coast. Larvae continued to cause defoliation of coast live oak in a few locales in Santa Cruz County.

SEQUOIA PITCH MOTH, Vespamima sequoiae.

North Coast. This insect continued to be a pest of ornamental Monterey pine throughout the North Coast Region.

Sierra. A heavy infestation of the sequoia pitch moth was found on lodgepole pines in the Gerle Creek Campground, Pacific Ranger District, Eldorado National Forest. Copious pitch accumulations were present on the majority of lodgepole pines growing individually and in thickets in and adjacent to riparian areas of the campground.

FALL WEBWORM, Hyphantria cunea

North Coast. Webbing and associated defoliation of Pacific madrone escalated in several areas of Santa Cruz County, and to the north in Sonoma, Mendocino, and Humboldt Counties.

Sierra. Small numbers occurred in the counties located in the Sierra Nevada Mountains in recent years. However, this defoliator became abundant in Amador, El Dorado, Nevada, and Yuba Counties in 1991.

BLACK PINELEAF SCALE, Nuculaspis californica.

Northern. High population levels of black pineleaf scale caused visible defoliation of pines in several widely scattered locations in northern California. Several hundred acres of ponderosa pine on Timber Mountain, Modoc County, had visibly reddened needles, or were defoliated. Ponderosa pine was infested over an area of approximately two square miles in the vicinity of Highway 299 and Pittville Road, Shasta County. Damage (shortened, yellowish needles and poor needle retention) varied substantially between trees and between sites, but appeared severest near the juncture of these roads.

Black pineleaf scale also caused visible defoliation of sugar pine. Aerial surveys detected several thousand acres on Skunk Ridge, east of Big Bend in Shasta County, where the mature sugar pine had thin yellow foliage due to a heavy scale infestation. Sugar pine were also visibly affected over broad areas south of Mt. Shasta, Siskiyou County, and north of Clear Lake, Lake County. The most likely explanation for simultaneous outbreaks in these widely

scattered locations is that unusually cold weather in February 1989 could have reduced the parasite populations enough to release the scale populations.

Sierra. A low level infestation of black pineleaf scale was reported on ponderosa pines in the Forest Creek plantation, Calaveras Ranger District (Stanislaus National Forest). Low levels of the pine needle scale, Chionaspis pinifoliae, were found associated with the black pineleaf scale in the plantation. In addition, moderate to heavy black pineleaf scale damage was reported in 40% of the crown of a rust resistant sugar pine on the Pacific Ranger District (Eldorado National Forest).

The lower branches of several sugar pine at the Foresthill Seed Orchard were heavily infested with this scale. Egg hatch in early August resulted in continuation of the infestation at a high level on these trees.

GOUTY PITCH MIDGE, Cecidomyia pinniopsis.

Northern. Ten-year-old ponderosa pines in several hundred acres of plantations located on the western slope of Mt. Shasta, Siskiyou County, were heavily flagged by the gouty pitch midge in the spring of 1991. Extremely cold, dry, windy conditions during the winter seemed to accentuate the amount of midge damage, and also caused a high amount of mortality among the midge larvae before they could pupate. Based on the low larval survival, and low number of puparia observed, only light damage is expected in the area during 1992.

Sierra. A light to moderate infestation of the gouty pitch midge was scattered over approximately 200 to 400 acres in the Wrights Creek plantation on the **Mi-Wok Ranger** District, Stanislaus National Forest. The infested trees are 30-year-old ponderosa pine planted after a wildfire in the early 1960's.

About half of the ponderosa pine in a 25-year-old plantation of 150 acres were damaged in Nevada County. Drought, low site quality, and severe brush competition were contributing factors.

GRASSHOPPERS, Acrididae.

Northern. High populations of grasshoppers were detected in progeny test plantations located near Big Lake, Trinity County, and Campbell Ridge, Humboldt County. The planted progeny at both sites were considered to be at high risk for injury or death because the trees were small, tender Douglas-fir seedlings which had recently been planted during the spring of 1991. This concern was compounded by the fact that both sites were exposed, and under 4,000 ft elevation, which caused the grass and herbaceous plants - an alternative food source for the grasshoppers - to be completely dry by mid-July. The ground within a few feet of each newly planted seedling was completely surrounded with a non-woven polyester mat to control competing vegetation. The feasible control treatments were to cut all vegetation back away from the edge of the mats for a distance of 15 to 20 ft to reduce grasshoppper perching sites, and to hand spread Nolo-Bait, a commercially available formulation of Nosema locustae, in the dried vegetation farther from the mats.

MATSUCOCCUS SCALE, Matsucoccus sp.

North Coast. Twelve to 24 ponderosa pine in and around Loch Lomond, Lake County, had branch flagging similar to that caused by Matsucoccus scale. Monitoring of these trees over several years revealed that none were sufficiently stressed to allow successful bark beetle attack.

Northern. This scale and dwarf mistletoe damaged ponderosa pine near McCloud Flats, Siskiyou County, but no damage was seen on trees at McCloud Flats. Several reports of bark sloughing from the upper bole of ponderosa pines were received from the McCloud and Mt. Shasta areas. Inspection of affected trees on McCloud Flats revealed that birds had been feeding on Matsucoccus scales. Similar feeding by birds was noted in the Grey Eagle area during an outbreak of M. bisetosus in 1986 and 1987. The scales are evidently utilized by birds as a source of food during the winter.

Southern California. The pinyon needle scale, Matsucoccus acalyptus, caused severe defoliation of 25 to 50% of young singleleaf pinyon pines located in a burn in Tulare County.

AN OAK LEAF GALL MIDGE, unknown.

North Coast. This was the third consecutive year of leaf galls on black oaks near Ukiah, Mendocino County. Damage was again noted on black oaks at Lake Pillsbury, Lake County. Occlusive netting of branches prior to budbreak successfully protected new leaves from gall damage.

MADRONE PSYLLID, Neophyllura arbuti.

The madrone psyllid has been abundant and destructive to madrone trees in the Sierra Nevada Mountains and coastal areas of California, particularly in the Santa Cruz area. The psyllid population was very high and damage was severe in the Mace Meadows area of Amador County. Many trees, including some with trunk diameters of a foot or more, were severely damaged or killed. The psyllid produces copious amounts of honeydew and the resultant sooty mold makes the trees sticky and unsightly. Heavily infested trees also were reported from Castro Valley, Alameda County (Cal. Plant Pest & Disease Reporter, 1991, vol. 10(1-2):14).

BLUE GUM PSYLLID, Ctenarytaina eucalypti.

The blue gum psyllid was found in California and North America for the first time in January 1991. It was first thought to be confined to Monterey and Santa Cruz Counties, but subsequent surveys found this psyllid in most coastal counties south of San Francisco (Fig. 1.1). In Australia, blue gum psyllid is usually found in alpine, montane, or cool to cold temperate areas. The cold temperatures of mid-December 1990 had deleterious effects on the trees, but the psyllid survived very well (Calif. Dept. of Food and Agr. Detection Advisory PD03-91).

The psyllid feeds and develops on very young leaves of blue gums, Eucalyptus globulus, E. bicostatus, E. leucoxylon, and E. pulverulenta, especially the juvenile growth. Unfortunately, it is this foliage which is of most value in

the floral trade, and the cultural practice is to keep the trees pruned back in order to produce juvenile foliage in abundance. Destortion of growing tips and possible sooty mold are concerns of the flora industry.

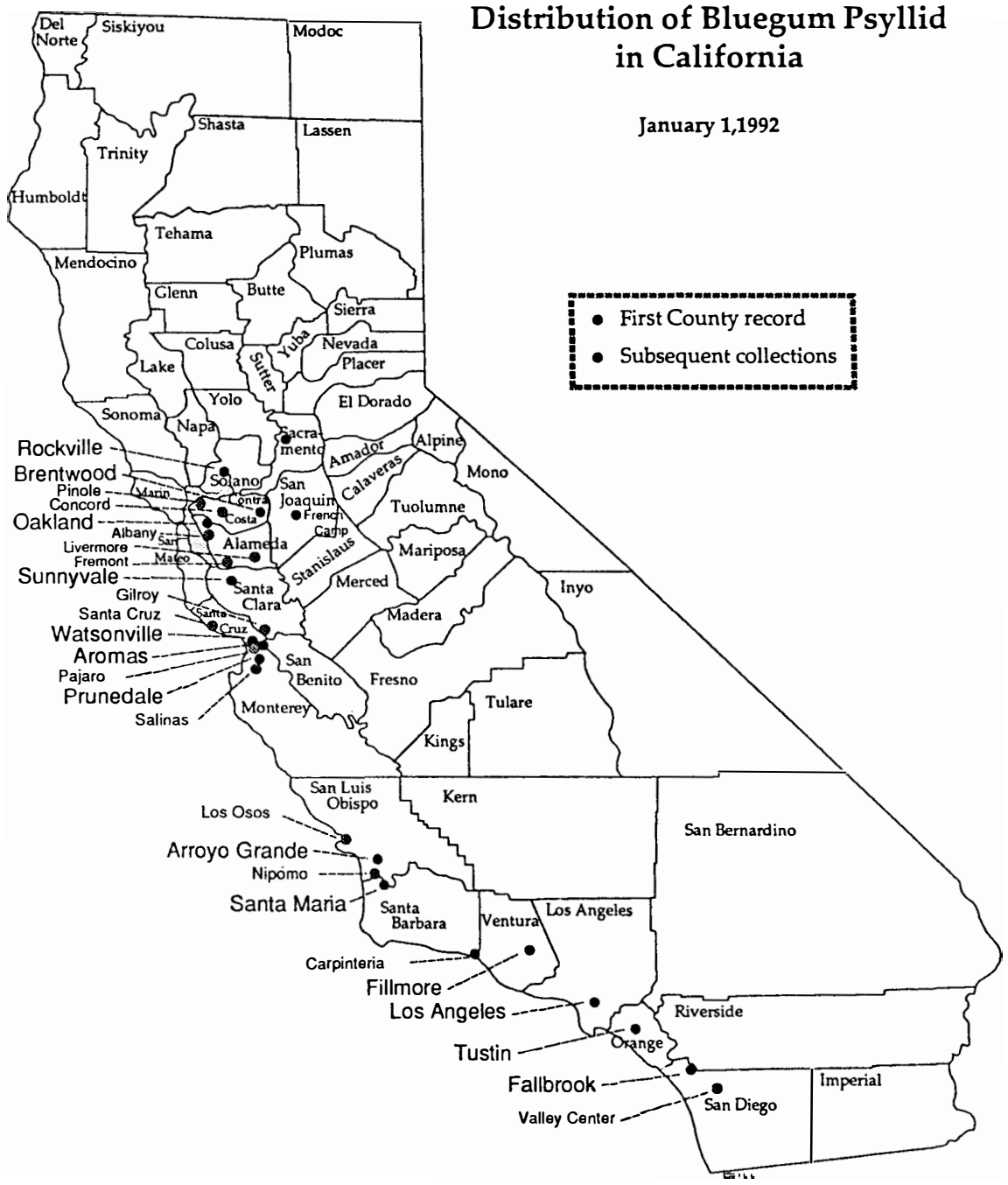


Figure 1.1. Distribution of the bluegum psyllid, Ctenarytaina eucalypti, in California, October 1, 1991. (By permission of Dr. Raymond J. Gill, editor, California Plant Pest and Disease Report, a publication of the California Department of Food and Agriculture.)

ASH WHITEFLY, Siphoninus phillyreae.

Northern and Southern California. Since its discovery in Los Angeles County in August 1988, this whitefly has spread to 47 counties (Fig. 1.2). The insect has been reported as far north in the Central Valley as Shasta County. Heavy infestations were noted on Oregon ash along the Sacramento River in Redding. Activity in southern California decreased, and two imported natural enemies, a wasp of the genus **Encarsia**, and a ladybird beetle, Clitostethus arcuatus, were thought responsible. These natural controls hold promise for suppressing populations to levels not causing economic damage. Research on these and additional imports from Europe, Asia, and Africa will continue.

Figure 1.2. Counties in California currently (2/92) infested with the ash whitefly, Siphoninus phillyreae. (By permission of Dr. Raymond J. Gill, editor, California Plant Pest and Disease Report, a publication of the California Department of Food and Agriculture.)

TABLE 1.1. Insects of Lesser Importance in California - 1991

INSECTS			WHERE EXAMINED OR REPORTED	
Scientific Name	Common Name	Host	County	Remarks
Altica ambiens	Alder flea beetle	WA	Del Norte	Defoliated alder on French Hill.
			Shasta	Extensive feeding in the Pit River canyon below Lake Britton.
Asterolecanium minus	Oak pit scale	BO	El Dorado	Twig injury.
Caralaspis juniperi	Juniper scale	GS	Placer	High populations on several trees at the Foresthill Breeding Orchard collapsed from predation.
Chionaspis pinifoliae	PP	PP	Calaveras	Endemic population in Forest Creek Plantation biomass thinning project, Calaveras Ranger District.
Cylindrocopturus eatoni	Pine reproduction weevil	PP	Nevada	South aspect, steep slopes
Callirhytis perdens	Ruptured twig gall wasp	BO	El Dorado	Cause damage to the twigs beyond the galls
?Dasineura gleditchiae	A pod gall midge	HL	Siskiyou	Repeated defoliations can cause the death of small branches.
Dioryctria sp.	A pyralid moth	SiP	Tulare	Minor trunk damage
Eriophyes mackiei	An Eriophyid gall maker	QA	Del Norte	Added to leaf discoloration caused by freeze and drought.
Otiorhynchus sulcatus	Black vine weevil	DF	Humboldt	Continues to cause some losses of nursery seedlings.
Pemphigus sp. (?populi-transversus)	an aphid	PT	Siskiyou	Marble-shaped gall injury to petiole at base of leaf.
Phymatodes lecontei	a roundheaded borer	LO	San Diego	Common in drought-killed limbs and trunks.

TABLE 1.1. (cont.)

INSECTS			WHERE EXAMINED OR REPORTED	
Scientific Name	Common Name	Host	County	Remarks
Platynota stultana	Omnivorus leafroller	WF, SP	Butte	Damage in shadehouse, Chico Tree Improvement Center decreased.
Pseudopityophthorus pubipennis	Western oak bark beetle	BO	Butte	Attacked trees near Magalia grammar school.
Petrova sp.	a pitch nodule moth	SiP	Tulare	Minor damage.
Scolytus unispinosus	Douglas-fir engraver	DF	Mendocino	Ten to 20 dryland-farmed Christmas trees were lost in southwestern Mendocino Co.
Unknown	Leafhopper	BM	Shasta, Siskiyou, Trinity	Leafhopper abundance was associated with severity of leaf scorch. Symptoms were less severe at higher elevations than in 1990.
Unknown	Willow gall mite	WW	Placer	
	A mite	RW	San Mateo	Severe injury.
?*Walshomyia cupressi*	A midge gall maker	CB	Shasta	No economic significance.

HOST ABBREVIATIONS

BO = Black oak	PT = Black cottonwood
BM = Bigleaf maple	QA = Coast live oak
CB = Baker cypress	RW = Redwood
DF = Douglas-fir	SiP = Single leaf pinyon
GS = Giant sequoia	SP = Sugar pine
HL = Honey locust	WA = White alder
LO = Live oak	SF = White fir
PP = Ponderosa pine	WW = Weeping willow

STATUS AND CONTROL OF DISEASES

A Report to the California Forest Pest Council from the Disease Committee

Melissa Marosy, Chair
Tim Tidwell, Secretary

Edited by Susan Frankel
December 30, 1991

STATUS AND CONTROL OF DISEASES

ABIOTIC DISEASES

Continued drought conditions caused tree mortality rates statewide to remain at elevated levels in 1991. An estimated 25% of the white and red fir in the Lake Tahoe Basin (Placer, El Dorado and Alpine Counties) are dead due to the drought. An estimated 500 MMBF of timber (out of a base of 2000 MMBF) have died over the last three years. Most of these trees are inaccessible or in wilderness areas. Moisture stress due to lack of rainfall and modest snow run-off made trees susceptible to bark beetle attack. Other secondary factors adversely affecting trees include root rot, mistletoe, road salts, sand-based abrasives and cavities excavated by woodpeckers. The large amount of dead and dry material has also increased the potential for catastrophic fires.

In 1990, the California Department of Forestry and Fire Protection estimated that over 5 billion board feet of merchantable timber on State lands was lost due to moisture stress. The USDA-Forest Service estimated that 10% of the trees in 18 National Forests statewide were dead due to drought stress and subsequent insect attack. On the approximately 6.5 million acres managed by the Forest Service for commercial timber, 2.6 billion board feet of timber were killed due to lack of water; with 1.6 billion planned to be salvaged. This is an increase from 1988 and 1989 levels of approximately 1 billion board feet dead each year (Gleick, P.H. and Linda Nash. 1991. The Societal and Environmental Costs of the Continuing California Drought. Pac. Inst. for Studies in Development, Environment, and Security. Berkeley, CA. 66 p.).

The severe cold temperatures of December 1990 and January 1991 led to considerable dieback of trees and woody shrubs in much of California. The cold temperatures occurred when there was a lack of protective snow cover in many areas. Species most notably affected were eucalyptus, manzanita, Ceanothus, and coast live oak. Myoporums lining the streets of Fort Bragg (Mendocino County) and Bushy Yate (eucalyptus) trees lining Highway 1 in Santa Cruz County were severely damaged. Many injured plants survived, but dieback was common.

The cold weather is also being blamed for damage and death of thousands of giant sequoia (Sequoiadendron giganteum) seedlings on the Tahoe, Eldorado, and Sequoia National Forests (Placer, El Dorado, Amador and Calaveras Counties).

Failure to remove trees from 3 gallon planting cans and water stress led to the decline and death of several 20-year-old knobcone pine trees on the Lytle Creek Ranger District, San Bernardino National Forest (San Bernardino County).

FOLIAGE DISEASES

The needle disease caused by Elytroderma deformans was visible in many stands in the Sierra Nevadas. Two areas with particularly heavy infection levels were the Clark Fork of the Stanislaus River (Tuolumne County) and the Cat Creek drainage on the Eldorado National Forest (El Dorado County). Other areas with widespread damage due to Elytroderma were the Trinity River drainage southwest of Lewiston (Trinity County) and Butte Creek Valley (Shasta County). In some areas, symptoms were present on overstory trees, but not on young understory trees, suggesting it has been a number of years since the last outbreak.

Several Forest Service Ranger Districts were including crown infection ratings for this disease in their salvage marking guides.

Dothiora taxicola, cause of a needle and shoot blight of Pacific yew, was widespread on the Gasquet Ranger District, Six Rivers National Forest (Del Norte County). The tips of many Pacific yew were killed by this fungus.

Naemacyclus sp. infections on Monterey pine increased along coastal Mendocino County and damaged Monterey pine Christmas trees inland from Half Moon Bay (San Mateo County).

Rhabdocline needlecast, caused by Rhabdocline pseudotsugae, was common on the Quincy Ranger District, Plumas National Forest (Plumas County). The fungus caused isolated patches of mortality in sapling and pole-sized timber.

Pacific madrone foliage was killed by an unidentified agent over much of northwestern California. Symptoms were expressed in 1990, but extensive foliar death did not appear until 1991. Infection probably occurred as a result of May rains in 1990. The situation may have been exacerbated by the extremely cold temperatures in December and January.

NURSERY DISEASES

Seedlings grown at the Humboldt Nursery (Humboldt County) were injured or killed by a number of diseases. Gray mold (Botrytis sp.) caused mortality and dieback of true fir, tip dieback in redwood, and loss of lower needles in Douglas-fir. Sirococcus strobilinus deformed and killed 1-0 Jeffrey pine. Powdery mildew was severe on big leaf maple seedlings. Septoria alnifolia caused leaf spots, defoliation, and death of red alder. Cedar leaf blight, caused by Didymascella (Keithia) thujina, caused only minor shot-holing on western red cedar foliage.

At Placerville Nursery (El Dorado County) Fusarium spp. caused scattered mortality, chlorosis and cankers on 1-0 Jeffrey pine. Seedling damage was observed during harvesting and occurred in the 1990 growing season.

Frost damage to Douglas-fir was sustained at Ben Lomond Nursery in Santa Cruz County when temperatures dipped into the mid-teens for two consecutive nights.

Gray mold, caused by Botrytis sp., produced dieback and mortality of 300 giant sequoia at the Chico Tree Improvement Center (Butte County).

ROOT DISEASES

Annosus root disease, caused by Heterobasidion annosum, was confirmed in several mixed conifer stands on the Tule River Indian Reservation (Tulare County). The root disease was confined to white fir. Annosus root disease also killed a small group of madrone northwest of Laytonville in Mendocino County. Several infection centers of annosus root disease were identified in a seven-year-old ponderosa pine and Douglas-fir plantation near Middle Creek Meadow on the Scott River Ranger District, Klamath National Forest (Siskiyou County). Both species of tree were being killed by the disease on the same center. The centers appear to have originated through the infection of large

diameter ponderosa pine stumps created during the harvest of the previous stand.

Black stain root disease, caused by Leptographium wageneri, continued to be responsible for chronic mortality of ponderosa pine in the Timber Mountain area of the Modoc National Forest (Modoc County). The high level of mortality was a concern because of the loss of economic value without salvage efforts, the buildup of fuels and fire potential, and the complications of mixed ownerships. Black stain root disease continued to spread in the South Fork Coyote Flat Draw of the Big Valley Ranger District, Modoc National Forest (Lassen County). The fungus infected sapling, pole, sawtimber and overmature ponderosa and Jeffrey pines on over 600 acres at 5700 - 6200 feet elevation. The district has identifed 34 distinct infection centers which range from single trees to contiguous areas of approximately 60 acres. The disease, along with secondary bark beetles, affected thousands of trees.

New occurrences of black stain root disease on Douglas-fir continue to be found in northern California. Trees planted in 1979 were identified as being infected in areas of the 1977 Hog Fire on the Klamath National Forest (Siskiyou County). Commercial size Douglas-fir in an area thinned near Shelley Ridge (Six Rivers National Forest, Del Norte County) several years ago were showing crown symptoms caused by black stain root disease. The disease is spreading in Douglas-fir in northeastern Mendocino County, north of Covelo and in southwestern Trinity County along the Long Ridge area. Several black-stain infected trees were also infested with fir flatheaded borers.

Black stain root disease killed single leaf pinyon pine (Pinus monophylla) in numerous centers scattered over land administered by the Bureau of Land Management in the Chimney Peak area (20,000 to 30,000 acres of Tulare County), and near Big Bear and Baldwin Lakes in the San Bernardino Mountains (San Bernardino County). Some trees appeared to be killed by the disease alone, while other infected trees were attacked and killed by bark beetles.

Black stain killed approximately 23 Jeffrey pine trees at 7,000 feet on 2 acres in the Sagehen Experimental Forest, Tahoe National Forest (Sierra County).

Port-Orford-cedar root disease, caused by Phytophthora lateralis, still appears to be restricted to the Smith River drainage (Del Norte County), except for a few isolated infections on the California portion of the Siskiyou National Forest. Surveys of Pacific yew for occurrences of P. lateralis have identified a number of additional infected trees within infested areas. Efforts are underway to minimize the chance of introduction of this fungus into the Klamath River drainage by removing Port-Orford-cedar along a stretch of county road from Oregon to Happy Camp on the Happy Camp Ranger District, Klamath National Forest (Siskiyou County).

Phytophthora cactorum was recovered from white fir Christmas trees near Camino, (El Dorado County). The fungus is causing cankers and branch dieback in a field that had been irrigated with an overhead irrigation system.

Armillaria root disease, caused by Armillaria spp., was found in many of the Douglas-firs attacked by flatheaded borers in northeastern Mendocino County, southeast Humboldt County, and southwest Trinity County along the Long Ridge area. Scattered tanoak in Mendocino County were also killed. The fungus was found infesting the roots and trunks of Sitka spruce killed by spruce beetle close to Patrick's Point State Park near Trinidad in Humboldt County. A few

ornamentals such as maple, Modesto ash, and dogwood were infected with Armillaria sp. in Sonoma County.

CANKER DISEASES

Pitch canker, caused by Fusarium subglutinans, continues to flag Monterey pine branches in both Santa Cruz and Alameda Counties. Some of the moderately to heavily infected trees were killed by pine engraver beetle and/or red turpentine beetles. Pitch canker has spread northward along Highway 1 to a mile or two past the Santa Cruz city limits.

A canker of Pacific madrone killed branches in many areas of northwestern California again in 1991. The canker is also widespread on the Soquel/San Jose Road in Santa Cruz County. Fusicoccum aesculi has been tentatively identified as the causal agent.

Botryosphaeria canker, caused by Botryosphaeria spp., was common on coast redwood and giant sequoia in Redding (Shasta County), Chico (Butte County), and in Napa, Sonoma, Mendocino, and Humboldt Counties. The fungus killed branches and tops of trees planted on low elevation, dry sites.

Cypress canker, caused by Seridium cardinale, was frequently observed on Italian cypress in Redding (Shasta County), Monterey cypress near Mendocino (Mendocino County), redwood in Sonoma County, and Leyland cypress near Little River in Mendocino County.

Oak branch dieback, caused by Diplodia quercina, continues to infect coast live oak throughout northwestern California. Oak pit scales, Cryptocline cinerescens and Discula quercina, were also recovered from trees infected with Diplodia quercina.

In Dunsmuir (Siskiyou County), stem and twig cankers and associated branch dieback of dogwood was tentatively identified as being caused by a fungus, Ascochyta sp.

MISTLETOES

True and dwarf mistletoes continued to degrade trees throughout the state. Below is a listing of reported infestations.

European mistletoe (Viscum album) was found for the first time in Fulton and Occidental (Sonoma Co.). This mistletoe was established in Sonoma County approximately 90 years ago by Luther Burbank and has spread approximately five miles from its point of introduction in Sebastopol. The parasite has been found on 23 different deciduous trees, but is most common on silver maple, apple, black loqust, red alder, and Fremont cottonwood. Survey results for 1971, 1986 and 1991, indicate that the rates of spread of the mistletoe will soon decline because the infested area is surrounded by coniferous forests and grasslands with few potential tree hosts and as a result, the parasite has reached its potential limit in many directions (Hawksworth, F.G., R.F. Scharph, and Melissa Marosy. 1991. Calif. Agr. 45(6):39-40).

Another true mistletoe, Phoradendron bolleanum ssp. densum, was reported on Baker cypress in the area of Cypress Camp at the trailhead to Thousand Lakes Wilderness (Shasta County).

The recently described dwarf mistletoe, Arceuthobium siskiyouense, was found on knobcone pine, in Humboldt County. This is only the second report of this parasite in the county.

Limber pine dwarf mistletoe, Arceuthobium cyanocarpum, was identified on western white pine near Castle Lake and Cliff Lake (Siskiyou County).

Arceuthobium occidentale was found on Monterey pine in a 85-year-old stand on private land near Hillsborough (San Mateo County).

Aerial survey and ground inspections revealed considerable branch flagging on red fir infected by Arceuthobium abietinum f.sp. magnificae in Shasta and Siskiyou counties. Another area of obvious flagging was along the Minarets Highway on the Sierra National Forest (Madera County). It was assumed that Cystopora canker (Cytospora abietis) was associated with many of these dead, mistletoe-infected branches.

Debilitating infections of western dwarf mistletoe, Arceuthobium campylopodum, were noted on ponderosa pine in limited areas of Butte Creek Valley, McCloud Flats (Shasta County), and Boggs Mountain Demonstration State Forest (Lake County).

The dwarf mistletoe Arceuthobium abietinum f. sp. concoloris caused brooming on white fir residuals saved to maintain visual quality in three harvested stands on the Big Valley Ranger District (Siskiyou County).

The few remaining overstory ponderosa pines infected by A. campylopodum in a plantation on the Covelo Ranger District, Mendocino National Forest (Mendocino County), were felled to remove the plantation's infection source. These few trees had not been treated in 1990 with bark beetle pheromone and had not been attacked. All trees that did receive pheromone treatment were attacked and killed.

Approximately 1500 acres on Happy Camp Ranger District, Klamath National Forest (Siskiyou County), were surveyed for dwarf mistletoe for possible suppression activities.

The Mammoth Ranger District, Inyo National Forest continued pre-suppression survey work in preparation for a dwarf mistletoe suppression project in lodgepole pine at Twin Lake Campground (Mono County).

The following dwarf mistletoe suppression projects were implemented in pines:

1) pruning and felling of mistletoe infected trees on 51 acres at Crystal Lake and Deer Flats campgrounds, Mt. Baldy Ranger District, Angeles National Forest (Los Angeles County),

2) pruning and felling of mistletoe infected trees on 222 acres in the Laguna Mountain area, Descanso Ranger District, Cleveland National Forest (San Diego County),

3) survey and girdling of mistletoe infected overstory trees on 5000 acres of plantations on the Milford Ranger District, Plumas National Forest (Plumas County),

4) survey and mistletoe infected branch and tree removal on 800 acres of the San Bernardino National Forest (San Bernardino County).

True mistletoe demonstration control projects were initiated in hardwoods at Lytle Creek Ranger Station, Apple White Campground, and Apple White day-use area, Cajon Ranger District, San Bernardino National Forest (San Bernardino County). Demonstration control projects for true mistletoe in conifers were set up at Pinyon Flat and Fern Basin Campgrounds, San Jacinto Ranger District, San Bernardino National Forest (San Bernardino Co.) and Crystal Lake Campground, Mt. Baldy Ranger District, Angeles National Forest (Los Angeles County). Data collected from these areas will be used to determine if chemical or silvicultural treatments effectively reduce the impacts of true mistletoes on hardwoods and conifers in recreation areas.

RUST DISEASES

Branch flagging and tree mortality from white pine blister rust, caused by Cronartium ribicola, remained common throughout the range of sugar pine in the Sierra Nevadas.

The effects of the earlier years of blister rust infection are beginning to be visible on larger trees. Bole cankers were observed on commercial-size sugar pines on the Shasta Lake Ranger District, Shasta-Trinity National Forests (Shasta County). It was not possible to accurately age these cankers, but it was apparent that these trees will be girdled in the near future. Pole-size sugar pines on Upper Coon Mountain, Gasquet Ranger District, Six Rivers National Forest (Del Norte County) are beginning to show the effects of girdling by blister rust. Entire hillsides that are exposed to autumn rains and fog have sugar pines that are yellowing from girdling bole cankers that resulted from infections in 1976.

Blister rust was reported to be affecting sugar pine east of the Kern River on the Kern plateau, on the Cannell Meadow Ranger District of the Sequoia National Forest (Kern County), and in the Mt. Sanhedrin area of Lake County. It was also confirmed on whitebark pine and western white pine in the Desolation Wilderness, near Ebbett's Pass (El Dorado County) and in the Sagehen area (Sierra County). Western white pine at 10,000 feet was infected with blister rust in Sequoia National Park (Tulare County).

Blister rust was reported to be widespread on sugar pine on 100+ acres on the north slope of Buck Butte, Big Valley Ranger District, Modoc National Forest (Modoc County). There had been no evidence of the disease during stand exams conducted in 1982-84, although one infected sapling was noted in 1986. It was thought that the Modoc National Forest was free of blister rust prior to 1985 or 1986. Since then, the disease has also been found on western white pine on the Warner Mountain Ranger District (Modoc County).

Screening of seedlings identified 94 new rust resistant trees in 1990-1991. The resistant trees are located on the Eldorado, Klamath, Mendocino, Plumas, Shasta-Trinity, Sierra, Stanislaus and Tahoe National Forests and on Georgia Pacific and Louisana Pacific lands. As of October 1, 1991, 1350 families were

in the screening process -- 700 from central California and 650 from northern California.

White pine blister rust resistant sugar pines on the Mendocino National Forest were again sprayed with carbaryl to protect them against attack by mountain pine beetle and red turpentine beetle. In addition, surrounding trees were thinned, and deep watering administered to each resistant pine.

The California Department of Forestry and Fire Protection sprayed 340 sugar pine trees for protection against bark beetle attack. The trees are known or suspected to be resistant to white pine blister rust. They are a mixture of trees with major gene resistance and other types of resistance. The 170 trees at Latour Demonstration State Forest (Shasta County) were sprayed once with carbaryl (Sevin 80S), and the 170 trees at Mountain Home Demonstration State Forest (Tulare County) were sprayed twice.

Western gall rust, caused by Peridermium harknessii, is causing increasing concern in the management of lodgepole pine on the McCloud Ranger District, Shasta-Trinity National Forests (Siskiyou County). The areas of severest infection tend to be low-lying, moist, frost pockets where lodgepole pine is the most suited species because of the microclimate. In some areas, heavy infections are also being seen on planted ponderosa pine. Widespread infection of lodgepole pine by western gall rust was also reported in Butte Creek Valley, where the rust caused pockets of nearly 100% mortality in smaller trees (Shasta County). The disease is also causing branch flagging of Bishop pine in northern Sonoma and southern Mendocino counties.

Pinyon blister rust, caused by Cronartium occidentale, was responsible for branch mortality on pinyon pine (P. monophylla) on Bureau of Land Management sites near Chimney Peak (Tulare County)

Blueberry rust, caused by Pucciniastrum goeppertianum, infected and made unsaleable several hundred white fir Christmas trees near Honeydew in Humboldt County.

AIR POLLUTION

Twenty-six trend plots for monitoring ozone injury have been revisited at two-year intervals since their establishment on the Sierra National Forest in 1977 (Madera and Fresno Counties). The recent trend in ozone effects on pines, as measured by foliar chlorotic mottle, has been one of decreasing injury. During the last six years, 81% of the plots have either remained at the same injury level or have improved. The remaining 19% experienced more injury. Five of these past six years have been very dry, and many plants show less susceptibility to ozone while under moisture stress.

DUTCH ELM DISEASE

Detections of Dutch elm disease, caused by Ceratocystis ulmi, increased by 25% from 1990. Two hundred and ninety (294) trees were confirmed (Table 2.1). Active areas include Walnut Creek, Martinez, Oakland, San Jose, Ross, Larkspur, San Anselmo, Petaluma, Atherton, Woodside, and Redwood City. Seven infected trees have been found in Sacramento County, where Dutch elm disease was first detected in 1990.

Increased disease incidence occurred primarily in areas that already had Dutch elm disease present. New sites in the outlying areas - Sacramento, Petaluma, Nicascio, Tiburon, and Gilroy - indicate that diseased wood had been moved into these areas.

In the fall of 1991, outplanting of disease-resistant elms was tried in Burlingame, Atherton, San Francisco, and San Jose.

TABLE 2.1. Number of Trees Confirmed with Dutch Elm Disease[a]

COUNTY	1985	1986	1987	1988	1989	1990	1991
Alameda	0	11	7	3	3	23	28
Contra Costa	21	30	35	35	34	38	29
Marin	154	125	83	91	82	46	56
Napa	2	3	2	9	5	4	7
Sacramento	0	0	0	0	0	10	7
San Francisco	0	0	0	0	0	0	0
San Mateo	63	44	47	70	48	60	108
Santa Clara	34	41	20	35	32	51	44
Solano	0	1	0	0	0	0	0
Sonoma	28	14	16	12	3	6	20
Total	302	269	210	255	205	238	299

a. Through January 1, 1992

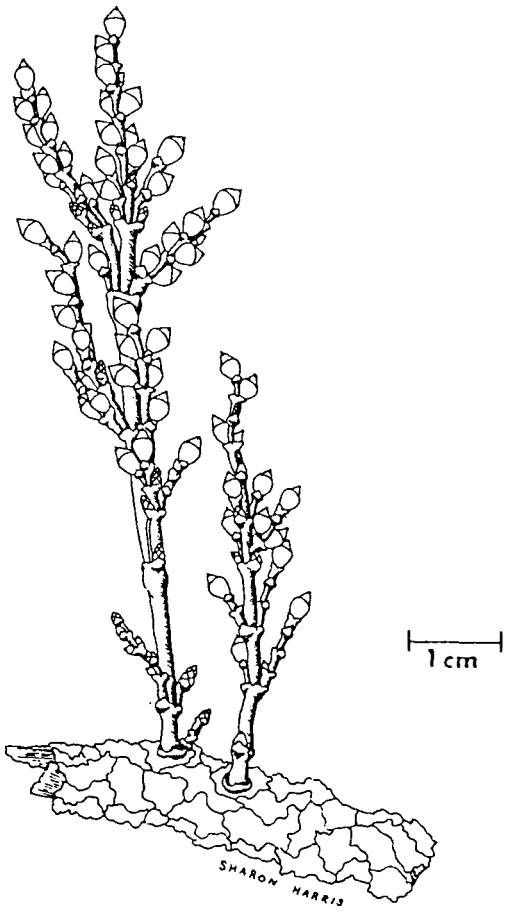


TABLE 2.2. **Forest Diseases Reported - 1991**[b]

AGENT	HOST	COUNTY
ABIOTIC INJURIES		
Air pollution	JP,PP	Kern, Fresno, Tahoe, San Bernardino
Drought	All species	Statewide
Cold temperature injury	Many species	Statewide
CANKER DISEASES		
Botryosphaeria spp.	GS,RW	Shasta, Napa, Sonoma, Mendocino, Humboldt, Butte
	Chaparral	Riverside, Los Angeles, San Diego
Cytospora abietis	RF	Host range
Fusarium subglutinans	MP	Alameda, Monterey, Los Angeles, San Benito, San Diego, San Francisco, San Luis Obispo, Santa Barbara, Santa Cruz
Fusicoccum sp.	MA	Humboldt, Sonoma Mendocino, Santa Cruz
Seridium cardinale	ItC	Shasta
	MC	Mendocino
	MeC	Mendocino
	LC	Mendocino
	RW	Sonoma
Diplodia quercina	QA	Northwestern Ca
Ascochyta sp.	CN	Siskiyou
FOLIAGE DISEASES		
Elytroderma deformans	PP,JP	Statewide

TABLE 2.2. (cont.)

AGENT	HOST	COUNTY
FOLIAGE DISEASES		
Maple scorch	BM	Siskiyou, Shasta, Trinity
Naemacyclus	MP	Mendocino, San Mateo
Rhabdocline pseudotsugae	DF	Plumas
NURSERY DISEASES		
Botrytis sp.	DF,RF,WH,RW	Humboldt
	GS	Butte
Didymascella (Keithia) thujina	WRC	Humboldt
Dothistroma pini	WWP,PP	Humboldt
Fusarium sp.	WF	Humboldt, El Dorado, Butte
	RF,JP	El Dorado, Butte
	SP	Butte, El Dorado, Santa Cruz
	DF,PP	Butte
Phoma sp.	DF	Humboldt
Phomopsis sp.	DF	Humboldt
Powdery mildew	BM	Humboldt
Septoria	AL	Humboldt
Sirococcus sp.	JP	Humboldt
PARASITIC PLANTS		
Arceuthobium siskiyouense	KP	Humboldt
Arceuthobium cyanocarpum	WWP	Siskiyou
Arceuthobium occindentale	MP	San Mateo
Arceuthobium campylopodum	PP,JP	Shasta, San Bernardino,
Arceuthobium abietinum	RF,WF	Mendocino, Lake

TABLE 2.2. (cont.)

AGENT	HOST	COUNTY
PARASITIC PLANTS		
Arceuthobium americanum	LP	Mono
Phoradendron sp.	WF	San Bernardino
Phoradendron bolleanum	BaC	Shasta
ROOT DISEASES		
Armillaria sp.	IC	Tuolumne
	DF	Mendocino, Humboldt, Trinity
	TO	Mendocino
	SS	Humboldt
	MM,FV,CN	Sonoma
Heterobasidion annosum	WF,PP	Tulare, Modoc, Mono, Toulumme,
	RF	Calaveras
	JP,JU	San Bernardino
	MA	Mendocino
Leptographium wagneri	PP	Modoc
	JP	Sierra
	DF	Del Norte, El Dorado, Siskiyou, Mendocino, Trinity
	SiP	Tulare, San Bernardino
Phytophthora lateralis	POC	Del Norte
Phytophthora cactorum	WF	El Dorado
RUST DISEASES		
Cronartium occidentale	SiP	Tulare
Cronartium ribicola	SP	Modoc, Kern, Tulare, Shasta, Del Norte, Siskiyou, Lake
	WBP	El Dorado
	WWP	Tulare

TABLE 2.2. (cont.)

AGENT	HOST	COUNTY
RUST DISEASES		
Endocronartium harknessii	LP,PP	Siskiyou, Shasta, Butte
	BP	Sonoma, Mendocino
Pucciniastrum goeppertianum	WF	Humboldt

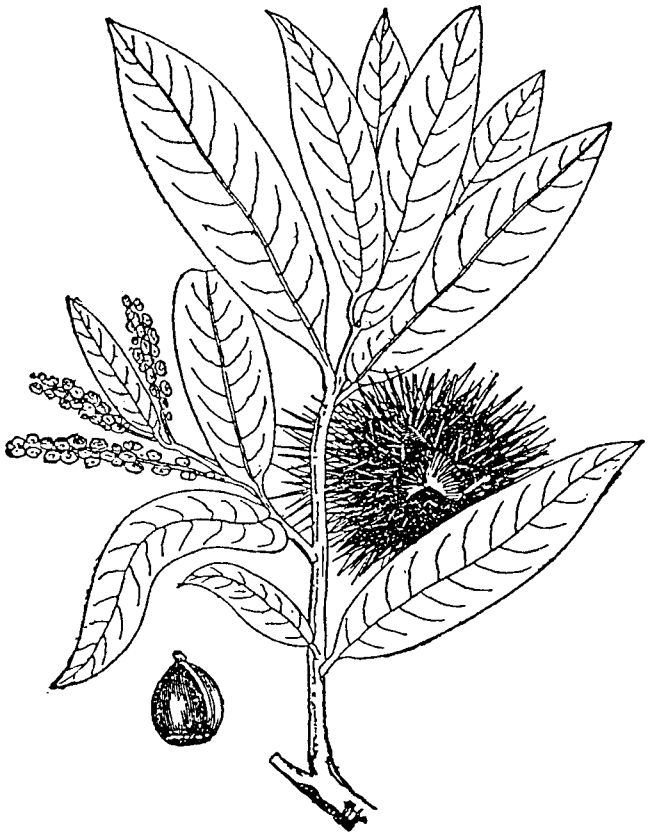
b. Not a complete listing for all locations reported, nor for reports of common diseases.

HOST ABBREVIATIONS

AL = Alder
BaC = Baker cypress
BO = Black Oak
BP = Bishop pine
BS = Brewer spruce
BM = Bigleaf maple
CN = Pacific dogwood
DF = Douglas-fir
EU = Eucalyptus spp.
FV = Modesto ash
GS = Giant sequoia
HL = Honey locust
HW = Hardwood
IC = Incense-cedar
ItC = Italian cypress
JP = Jeffrey pine
JU = Juniper
KP = Knobcone pine
LC = Leyland cypress
LP = Lodgepole pine
MA = Pacific madrone
MeC = Mendocino cypress
MC = Monterey cypress
MeC = Mendocino cypress
MM = Maple
MP = Monterey pine
OA = Oak
PA = London plane tree
PO = American plane tree
POC = Port-Orford-cedar
PP = Ponderosa pine
PT = Black cottonwood
QA = Coast live oak
QW = Interior live oak
RF = Red fir
RW = Redwood
SiP = Singleleaf pinyon pine
SP = Sugar pine
SS = Sitka spruce
TO = Tan oak
WA = White alder
WBP = Whitebark pine
WF = White fir
WH = Western hemlock
WRC = Western red cedar
WW = Weeping willow
WWP = Western white pine

STATUS AND CONTROL OF WEEDS

A Report to the California Forest Pest Council from the Weed Committee



Nelson Money, Chair
Glenn Lunak, Secretary

Edited by John Dale
December 30, 1991

STATUS AND CONTROL OF WEEDS

Forest management on private, state, and federal lands continues to be progressively restricted by government, and acres devoted to timber production continue to decrease. The reduced forest area available for intensive timber management now bears a greater demand to "maximize" growth. As a result, the need to control weed competition in forest plantations where survival is threatened and growth is reduced, grows ever greater.

For the first time since 1984, the U.S. Forest Service, Pacific Southwest Region, applied herbicides (Table 3.1). The initial step of reintroducing herbicides as a management tool was small, but it was a beginning. Private land owners continued to use herbicides during this time. The California Environmental Protection Agency reported a total of 23,866 acres treated in 1990 (Table 3.2). Figures for 1991 were not yet available and will be presented in the conditions report for 1992.

TABLE 3.1. Acres of National Forest Lands in California Treated with Herbicides - 1991

	ACRES TREATED 1991[a]	
Herbicide	Acres	Treatment for:
Atrazine	8	research
Glyphosate		
	1,470	conifer releases
	440	general weed control
	11	site preparation
	21	research
	3	right-of-way
	1,945	
Triclopyr		
	555	conifer release
	4	research
	559	
Hexazinone		
	1.0	conifer release
	0.3	research
	1.3	
TOTAL	1,951.3[b]	

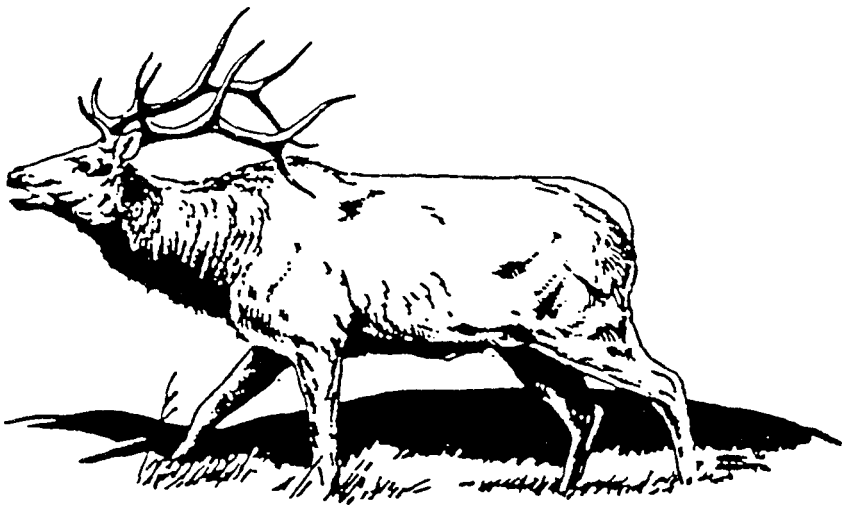
a. As of November 1, 1991.
b. The total acres treated is 1,951.3 because 554 acres were treated with a mixture of **both** glyphosate and triclopyr.

Table 3.2. Acres of Private Forest Lands Treated with Herbicides in 1990

Herbicide	Acres Treated
Atrazine	303
2,4-D	1,315
Glyphosate	2,810
Hexazinone	9,648
Triclopyr	9,790
Total	23,866

STATUS AND CONTROL OF ANIMAL PESTS

A Report to the California Forest Pest Council from the Animal Damage Committee



Gregory A. Giusti, Chair
Robin Breckenridge, Secretary

Edited by: John E. Borrecco
January 31, 1992

STATUS AND CONTROL OF ANIMAL PESTS

INTRODUCTION

This report summarizes the Animal Damage Committee's annual survey of vertebrate damage to forest trees. The survey is accomplished by mailing a simple form to private timber companies, federal and state agencies, and other organizations who manage forest lands in California. The survey form requests summary information by pest species regarding species of trees injured, age class of trees, acres over which damage occurs, number of trees per acre damaged, whether damage occurs in plantations or other areas, the general trend in damage relative to past conditions, and control methods used. Results of this survey are reported as part of the California Forest Pest Council's annual overview of forest pest conditions in California.

In August 1991, 105 survey forms were mailed to federal and state agencies, private timber companies, and other private organizations managing forested lands in California. A total of 44 (42% return) responses were received.

RESPONDENTS AND LOCATION OF REPORTS

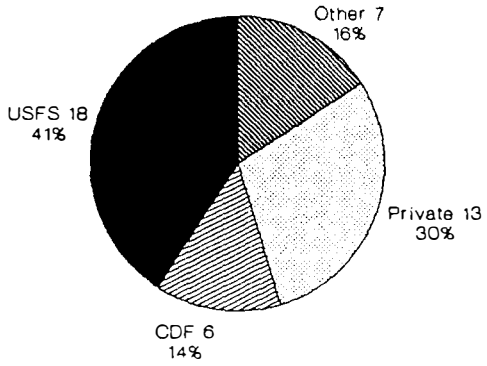
Survey forms were returned by representatives of the U.S. Forest Service (18), California Department of Forestry and Fire Protection (6), private timber companies (13), and various other organizations (7), including the National Park Service (5), California Department of Parks and Recreation (1), and the University of California's Northern California Coast Range Preserve (1).

Incidence of damage to trees was reported from 36 counties representing over 75% of the land area of California. Counties represented were: Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kern, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Modoc, Mono, Monterey, Nevada, Placer, Plumas, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Trinity, Tulare, Tuolumne, and Yuba.

SPECIES CAUSING DAMAGE

A variety of mammal species are causing damage to forest trees, and the damage varies by region of the state and by land ownership (Table 4.1). Species most commonly identified in this survey (as well as in previous years) as causing problems are deer (66% of respondents), pocket gopher (50%), domestic stock (43%), and porcupine (30%). Rabbits and hares (18%) and black bears (13%) also are reported frequently. Deer, pocket gophers and livestock feeding injuries on trees occur throughout the state on most ownerships. Damage by other species tends to be more limited geographically. No damage was reported for birds or small seed-eating mammals.

Organizations returning surveys

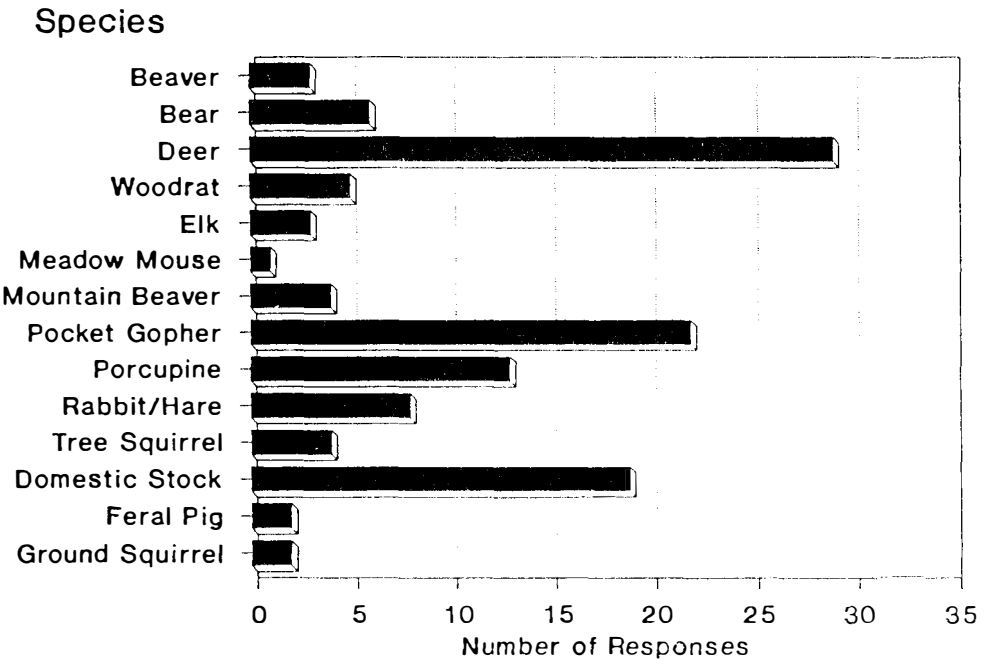


Counties represented in survey

Table 4.1. Number of damage responses reported by vertebrate species (n=44)

Species	USFS	CDF&FP	Private	Other	TOTAL
Beaver	2	1	0	0	3
Bear	1	1	4	0	6
Deer	14	5	9	1	29
Woodrat	0	0	5	0	5
Elk	2	0	1	0	3
Meadow Mouse	1	0	0	0	1
Mountain Beaver	1	0	2	1	4
Pocket Gopher	15	2	5	0	22
Porcupine	6	3	4	0	13
Rabbits & Hares	5	1	2	0	8
Tree Squirrels	1	2	1	0	4
Domestic Stock	10	2	5	2	19
Feral Pigs	0	0	0	2	2
Ground Squirrels	1	0	0	1	2
TOTAL	59	17	38	7	121
(n)	(18)	(6)	(13)	(7)	(44)

Species Causing Damage



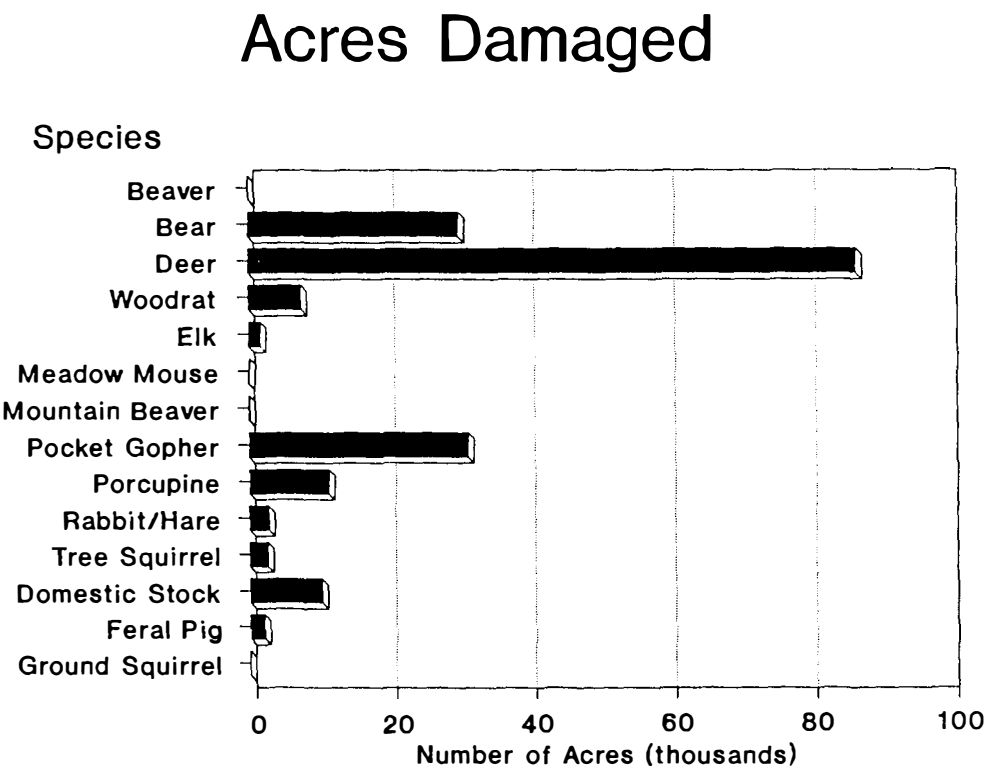
SCOPE OF DAMAGE

Damage from all sources was reported on about 186,000 acres (Table 4.2). All of California's major timber producing regions and timber types have reported damage by vertebrate species. Based on the acres of damage, the species ranking changes only slightly: deer (47% of the acres), pocket gopher (19%), black bear (16%), porcupine (6%), domestic stock (5%), woodrate (4%), and all others (< 5%).

Table 4.2 Number of acres reported to be receiving some level of damage

Species	USFS	CDF&FP	Private	Other	TOTAL
Beaver	5	10	0	0	15
Bear	21	*	30,000	0	30,021
Deer	24,890	1,507	60,165	*	86,562
Woodrat	0	0	7,500	0	7,500
Elk	670	0	1,000	0	1,670
Meadow Mouse	40	0	0	0	40
Mountain Beaver	100	0	*	1	101
Pocket Gopher	29,175	202	1,860	0	31,237
Porcupine	10,307	55	900	0	11,262
Rabbits & Hares	2,438	100	200	0	2,738
Tree Squirrels	*	40	2,500	0	2,540
Domestic Stock	6,431	300	3,500	0	10,231
Feral Pigs	0	0	0	2,000	2,000
Ground Squirrels	5	0	0	6	11
TOTAL	74,082	2,214	107,625	2,007	185,928
(%)	(40)	(1)	(58)	(1)	(100)

* Incidence of damage was reported, but information was not given on how many acres were affected.



SPECIES ACCOUNTS

BEAVER

Species Damaged: Black oak, valley oak, aspen, willow, and riparian vegetation.
Damage Trend: Static to increasing.
Control Methods: None (3/3).
Damage Location: Riverside, San Bernardino, and Shasta Counties.
Comments: Damage reported to saplings, poles, mature trees and other riparian vegetation at levels ing from 5 to 200 trees/acre.

BEAR

Species Damaged: Douglas-fir, redwood, and Port Orford cedar.
Damage Trend: Increasing.
Control Methods: Sport hunting (1/6), none (5/6).
Damage Location: Del Norte and Humboldt Counties
Comments: While damage was reported in both plantations and natural stands to trees of all ages, trees from 10 to 40 years old were most commonly damaged. Levels of damage vary from 1 tree/acre in older stands up to 100 trees/acre in younger stands. Black bears are primarily a problem on private timber lands on the north coast of California.

DEER

Species Damaged: Douglas-fir, redwood, ponderosa pine, sugar pine, western white pine, Coulter pine, Jeffrey pine, lodgepole pine, white fir, red fir, incense cedar, giant sequoia, and black oak.
Damage Trend: Static to increasing.
Control Methods: Seedling protectors (13/29), repellents (4/29), fencing (1/29), and none (12/29).
Damage Location: Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kern, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Modoc, Mono, Nevada, Placer, Plumas, Riverside, San Bernardino, San Diego, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Trinity, Tulare, Tuolumne, and Yuba Counties.
Comments: Most damage occurs to seedlings 1-10 years old in plantations. Levels of damage reported varied from 2 to 1000 trees/acre but most respondents reported in the range of 50 to 300 trees/acre. Seedling protectors include plastic mesh tubes, milk cartons, bud caps, and plastic mesh netting.

WOODRAT

Species Damaged: Douglas-fir and redwood.
Damage Trend: Static.
Control Methods: Seedling protectors (1/5), none (4/5).
Damage Location: Humboldt, Lake, Mendocino, and Sonoma Counties.
Comments: Damage to trees 5-30 years old. Woodrat damage is primarily reported by foresters with private timber companies on the north coast of California. Generally considered a minor problem.

ELK

Species Damaged: Douglas-fir, white fir, incense cedar, ponderosa pine, lodgepole pine, western white pine.
Damage Trend: Static to increasing.
Control Methods: Seedling protectors (2/3), none (1/3),
Damage Location: Humboldt, Lassen, Modoc, and Siskiyou Counties.
Comments: Damage occurs to seedlings less than 10 years old at levels of 20 to 300 trees/acre. A few years ago reports of elk feeding injuries were limited to counties on the north coast. While still a minor problem, reports are now being received from other northern counties.

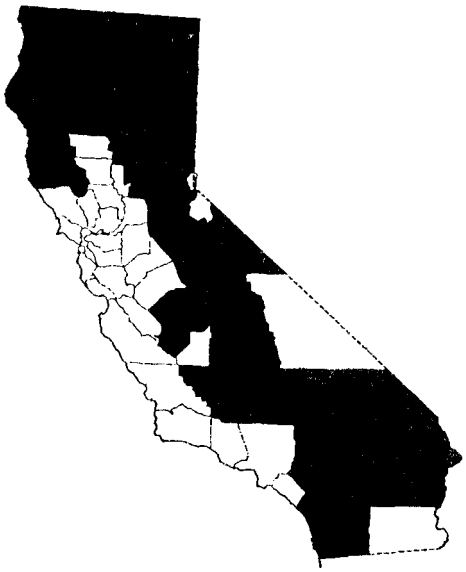
MEADOW MOUSE

Species Damaged: Douglas-fir.
Damage Trend: Increasing.
Control Methods: None (1/1).
Damage Location: Siskiyou County.
Comments: Damage reported to be occurring in plantations on about 50 seedlings/acre.

MOUNTAIN BEAVER

Species Damaged: Douglas-fir, white fir, ponderosa pine, Jeffrey pine, and willow.
Damage Trend: Static.
Control Methods: Trapping (1/4), none (3/4).
Damage Location: Humboldt and Siskiyou Counties.
Comments: Most damage occurs in plantations to seedlings 1-10 years old. Some injury to riparian vegetation also reported.

POCKET GOPHER



Species Damaged: Douglas-fir (including big cone Douglas-fir), white fir, red fir, ponderosa pine, Jeffrey pine, Coulter pine, lodgepole pine, sugar pine, and western white pine.
Damage Trend: Static to increasing.
Control Methods: Strychnine bait (12/22), trapping (1/22), none (10/22).
Damage Location: Amador, Butte, Calaveras, El Dorado, Fresno, Humboldt, Kern, Lake, Lassen, Madera, Mariposa, Mendocino, Modoc, Mono, Neveda, Placer, Plumas, Riverside, San Bernardino, San Diego, Shasta, Sierra, Siskiyou, Tehama, Trinity, Tulare, Tuolumne, and Yuba Counties.
Comments: Most damage to seedlings in plantations, but some damage to saplings up to 20 years old. Levels of damage reported range from 10-1000 trees/acre. This is

the number one vertebrate pest on National Forest lands in terms of both acres with damage and number of respondents.

PORCUPINES

Species Damaged: Douglas-fir, white fir, ponderosa pine, Jeffrey pine, and lodgepole pine.
Damage Trend: Static to decreasing.
Control Methods: Hunting and trapping (1/13); thin, replant and tree guards (1/13); none (11/13).
Damage Location: Del Norte, Fresno, Lake, Lassen, Madera, Mariposa, Mendocino, Modoc, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity Counties.
Comments: Seedlings to mature trees reported damaged with levels of damage ranging from 1 to 200 trees/acre.

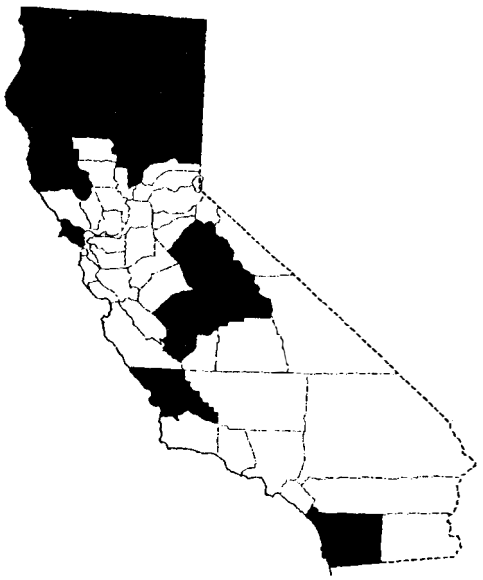
RABBIT & HARE

Species Damaged: Douglas-fir, white fir, red fir, ponderosa pine, Jeffrey pine, lodgepole pine, sugar pine, western white pine.
Damage Trend: Static.
Control Methods: Seedling protectors (5/8), none (3/8).
Damage Location: Colusa, Glenn, Lake, Lassen, Mariposa, Mendocino, Modoc, Shasta, Siskiyou, Sonoma, Tehama, Trinity, and Tuolumne Counties.
Comments: Damage to seedlings 1-5 year old in plantations. Levels of damage reported range from 1 to 500 trees/acre.

TREE SQUIRREL

Species Damaged: Redwood, ponderosa pine, sugar pine (including rust-resistant sugar pines).
Damage Trend: Static to decreasing.
Control Methods: Banding (1/4), none (3/4).
Damage Location: Del Norte, Humboldt, Mendocino, Shasta, and Siskiyou Counties.
Comments: Damage is generally to cones on older trees.

DOMESTIC STOCK



Species Damaged: Douglas-fir, white fir, red fir, redwood, ponderosa pine, Jeffrey pine, lodgepole pine, western white pine, black oak, blue oak, willow, cottonwood, sycamore.
Damage Trend: Static to increasing.
Control Methods: Placement of salt (2/19), herding (1/19), seedling protectors (2/19), fencing (1/19), allotment plan to regulate numbers (1/19), none (12/19).
Damage Location: Butte, Del Norte, Fresno, Humboldt, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Modoc, Plumas, San Diego, San Luis Obispo, Shasta, Sierra, Siskiyou, Tehama, Trinity, Tuolumne, and Yuba Counties.
Comments: Most respondents reported damage to seedlings and saplings 1-10 years old in plantations. Damage to riparian vegetation was also reported. Levels of damage varied from 5 to 500 trees/acre.

FERAL PIGS

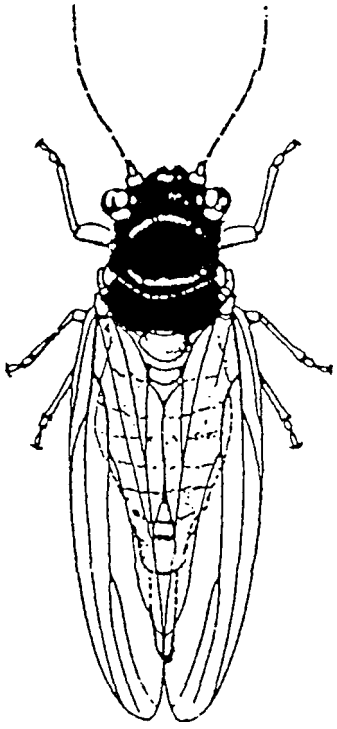
Species Damaged: Coast live oak and valley oak.
Damage Trend: Increasing.
Control Methods: None (2/2).
Damage Location: San Benito County.
Comments: Pigs are eating large portion of acorn crop decreasing possibility of seedling establishment.

GROUND SQUIRREL

Species Damaged: Ponderosa pine, coast live oak, and blue oak.
Damage Trend: Increasing.
Control Methods: Trapping and gas cartridges (1/2), none (1/2).
Damage Location: Fresno, Kern, Monterey, San Benito, and Tulare Counties.
Comments: Damage is most significant on mature trees in developed recreation sites although damage to seedlings (1-5 years old) also reported in a progeny test site. Squirrels undermine roots and ex pose them to disease and moisture stress.

KNOW YOUR FOREST PEST

A Report to the California Forest Pest Council from the Insect Committee



Don Owen, Chair
John W. Dale, Secretary
Edited by John W. Dale
December 30, 1991

KNOW YOUR FOREST PEST

BLUE GUM PSYLLID

Blue Gum Psyllid Biological Control Project[1]

Dr. Donald L. Dahlsten, Principal Investigator
Prepared by Dr. Richard L. Tassan
University of California, Berkeley
Division of Biological Control

The Blue Gum Psyllid, Ctenarytaina eucalypti, was first detected in Monterey County, California in January 1991. The psyllid attacks a number of Eucalyptus species grown in California and has potential impact in floral, nursery, landscape, wood and fuel industries and in naturalized stands. High psyllid populations may cause reduced plant growth, reduced product marketability and increased production costs. Confirmed identification has now been made of specimens collected in 13 counties; and specimens, suspected to be C. eucalypti, have been collected in four additional counties (Fig. 5.1). The psyllid is thought to originate from Australia and has been introduced into New Zealand, South Africa and Britain.

Psyllids are commonly refered to as jumping plant lice. They are small and have the appearance of tiny cicads (Fig. 5.2). The blue gum psyllid is large compared with many other California psyllids and reaches a total length of 2.0 mm. There are five immature stages that resemble adults without wings and multiple generations per season. In Australia, the blue gum psyllid is usually found in alpine, montain, or cool to cold temperature areas. It feeds and develops on very young leaves of blue gums, Eucalyptus globulus, E. bicostatus, E. leucoxylon, and E. pulverulenta, especially juvenile forms (Calif. Plant Pest & Disease Report, May 1991, 10(1-2):5-7). Unfortunately, it is this flush growth, rather than the older leaves, which is of most value in the floral trade, and the cultural practice is to keep the trees pruned back in order to produce juvenile foliage in abundance. Destortion of growing tips and discoloration from sooty mold are concerns of the flora industry (Calif. Plant Pest & Disease Report, September 1991, 10(3-4):47).

The Division of Biological Control intends to import natural enemies of the Blue Gum Psyllid from Australia into California for implementation of a biological control approach to regulate psyllid pcpulations. Following is an outline of current field and laboratory studies and foreign exploration.

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1. Editor's note. This presentation was taken in part from a talk given by Dr. Tassan at the Meeting of the Board of Directors, Eucalyptus Improvement Assoc., Ind., December 2, 1991, Lockeford, CA. It is included here because of the potential impact of this insect on wood and fuel industries in California. Future annual reports will continue to follow this research and the damage caused by this exotic insect. Results of the research will be published in a refereed scientific journal.

FIELD STUDIES

Immediate Objectives

1) Establishing a sampling system.
2) Determine distribution of psyllids within trees.
3) Establish baseline psyllid populations in preparation to the introduction of natural enemies from Australia.
4) Compare psyllid populations in insecticide treated and untreated plots.
5) Identify endemic natural enemies attacking psyllids and assess their impact on psyllid densities.

Beginning September 26, 1991, two study plots were established at 3-Way Farms, Monterey County. Within each plot, ten trees were selected at random from three central rows, with each row separated by two rows. The trees were marked and the same trees will be sampled throughout the season. Currently, these plots are sampled at three week intervals. Sampling consists of taking eight, 15 cm shoots from each tree. One shoot is cut from the upper and lower levels of the tree at each cardinal direction - north, west, south and east. Each shoot is placed in a labelled zip-loc bag, and taken to the laboratory for evaluation. A total of 80 shoots are collected from each plot. Both plots have been managed identically and have received four insecticide applications between June 15 and early August 1991. One plot (designated unsprayed) will not receive any further treatments, while the grower will treat the other plot (sprayed plot) with insecticides whenever he determines psyllid populations are too high.

The shoots are evaluated in the laboratory. A mite-brushing machine is used to brush the psyllids off each shoot onto a sticky plate. The number and stages of psyllids brushed onto the plant are recorded by examining the plates under a dissecting microscope. Each shoot is classified as to leaf type (pointed or rounded), the length and width of its largest leaflet is measured and the distance betwen each node is measured.

Evaluation of shoots from the first three sample dates has been completed. The field data indicates that psyllid populations doubled in size during each three week interval. Temperatures dropped in during November and the data from the fourth sample probably will show that psyllid populations are still increasing, but at a reduced rate.

LABORATORY STUDIES:

Immediate Objectives:

1) Establish laboratory populations under quarantine conditions in preparation to receive natural enemies from Australia.
2) Begin studies on biology of psyllids under controlled conditions.

McLellan Nurseries and Brothers Brothers provided 75 containerized plants to begin these studies. In preparation to receive natural enemies from Australia, several pure psyllid colonies have been started in cages; one under greenhouse conditions and the other in quarantine, under cooler laboratory conditions. Female psyllids readily oviposited at each condition, and nymphal development seems to be progressing normally. As expected, those held at cooler laboratory conditions develop a little slower compared with the colonies held in the greenhouse.

FOREIGN EXPLORATION:

Immediate Objectives:

1) Search southeastern region of Australia for Blue Gum Psyllid natural enemies.
2) Export psyllid natural enemies to California for evalution and release.

Dr. Dahlsten has been in Australia since the end of September of 1991 and plans to stay through April 1992. His center of activity is the Keith Turnbull Research Institute, near Melbourne. He has established two sample plots in E. globulus plantations nearby. Although his arrival conincided with unseasonably cool spring temperatures, he has collected samples at one site in Tasmania and three sites about 150 km east of Melbourne. Two consignments of parasitized blue gum psyllid nymphs have arrived at the quarantine facility in Albany, CA. The first arrived November 15, the second November 21, and a third is expected during the first week of December. The latter came from a trip into the Canberra area.

The first two shipments have yielded what we believe is one primary parasitoid species. It is an encyrtid wasp, tentatively identified as belonging in the genus Psyllaephagus. Nine females and nine males from the first shipment have been set up in the presence of an psyllid infested plant in quarantine for evaluation. The first indication of successful laboratory parasitism appeared the last week of November with appearance of a mummified psyllid.

In addition to the primary parasitoid species which emerged in quarantine, several individuals have emerged that have been identified as being hyperparasitoids (parasites whose host are other parasites) of the primary parasitoid species. These have been killed and preserved. Dr. Dahlsten reports also having reared a syrphid fly and a brown lacewing from individuals he found feeding on psyllids. But so far, he has not observed any coccinellids (ladybird beetles) associated with the blue gum psyllid populations.

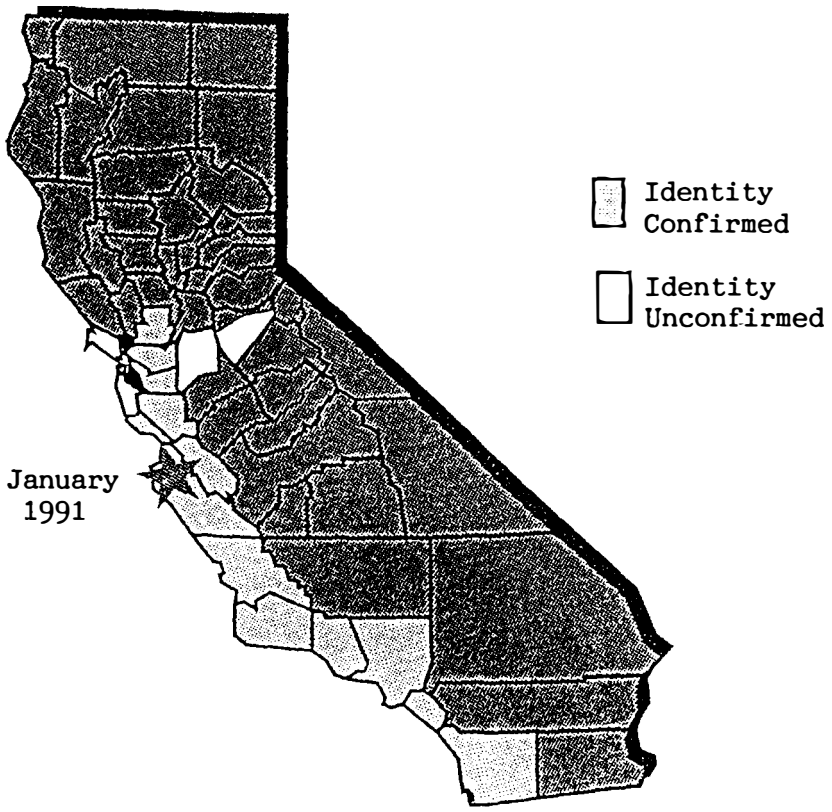

Fig. 5.1. Blue Gum Psyllid distribution in California, November 1991.

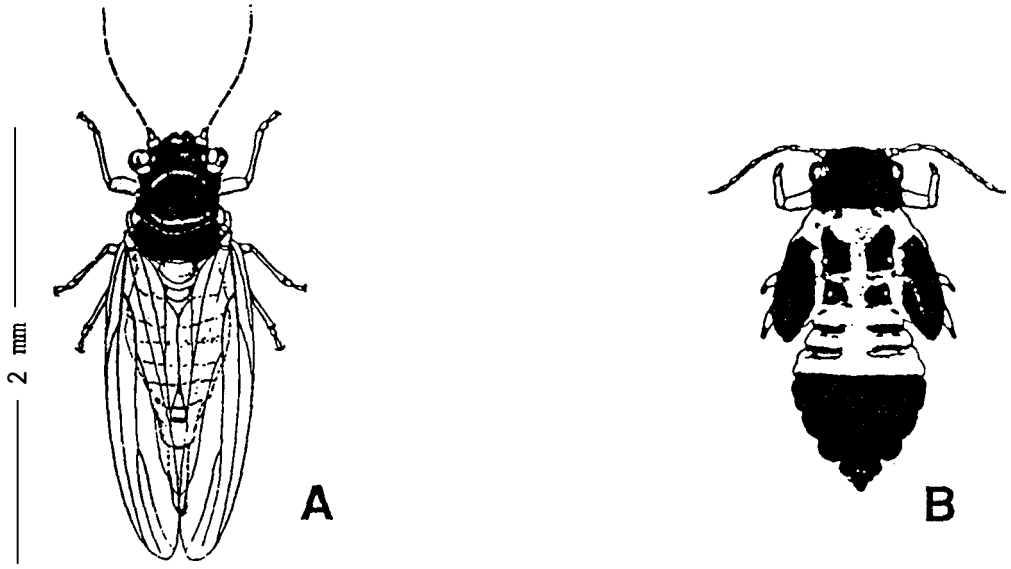

Fig. 5.2. Adult (A) and nymph (B) of the Blue Gum Psyllid, Ctenarytaina eucalypti. (Reprinted by permission of Dr. Raymond J. Gill, editor, California Plant and Disease Report, a publication of the California Department of Food and Agriculture.)

SURVEYS AND EVALUATIONS

A Report to the California Forest Pest Council from the Editorial Committee

Don Perkins, Chair
John W. Dale, Editor-in-Chief
Edited by John W. Dale
December 30, 1991

DEMONSTRATION THINNING PLOTS IN THE EASTSIDE PINE TYPE ON THE LASSEN NATIONAL FOREST. In 1978-1979 the Forest Service established plots in the eastside pine type to show the effects of thinning on pest-caused losses in areas of high tree mortality. The stands chosen were mostly pole-size ponderosa pine mixed with some white fir and incense-cedar, growing on medium to low sites, and ranging in age from 70 to 90 years. Within the demonstration plots, four levels of stocking density -- 40, 55, 70, and 100 percent of normal basal area -- were established to demonstrate the biological and economic alternatives available for management planning. (Normal basal area is the basal area that a stand should have reached when fully stocked with trees, which in the demonstration areas, ranges from 185 to 215 sq ft/ac, depending on site quality.) Ten years after thinning, the treatments had reduced mortality from 90 to 100 percent of the level in unthinned stands (Table 6.1).

Table 6.1. Commercial tree mortality by stocking level, twelve years after thinning[a]

Year	Residual Stocking After Thinning[b] 40%	55%	70%	100%
		Trees per Acre		
1980	0.0	0.2	0.2	2.4
1981	0.0	0.0	0.7	2.4
1982	0.0	0.5	0.3	3.6
1983	0.0	0.1	0.8	4.1
1984	0.0	0.0	0.0	1.0
1985	0.0	0.2	0.0	0.6
1986	0.0	0.0	0.0	1.3
1987	0.0	0.0	0.0	1.4
1988	0.0	0.0	0.0	0.0
1989	0.0	0.4	0.0	2.6
1990	0.0	0.0	0.0	2.6
1991	0.0	0.0	0.0	1.8
Mean	0.0	0.1	0.2	2.0
Range	0	0-0.5	0-0.8	0.0-4.1
Percent Mortality Reduction Compared with Normal Basal Area	**100**	**95.0**	**90.0**	**---**

a. Commercial trees are 8 inches dbh and larger, with straight boles, yielding at least one 10-foot log with a 6-inch top. Trees were killed by the mountain pine beetle.
b. Percent of normal basal area.

TREE DIAGNOSES, CDF&A. The California Department of Food and Agriculture is frequently requested to identify the cause of injury or disease on various species of trees. The latest listing is given in Table 6.2.

Table 6.2. California Department of Food and Agriculture, tree diagnoses from January through November 1991

HOST TREE	DIAGNOSIS	COUNTY
Abies concolor (Christmas trees)	Phytophthora cactorum (aerial shoot blight)	El Dorado
Acer japonicum (full moon maple)	Verticillium dahliae (Verticillium wilt)	Sacramento
Acer palmatum (Japanese maple)	Armillaria mellea (oak root fungus)	San Francisco
Acer palmatum	Verticillium dahliae (vascular wilt)	Humboldt, Sacramento
Acer palmatum	Oidium sp. (powdery mildew)	Contra Costa
Acer saccharinum (silver maple)	Pestalotiopsis guepini (wood decay fungus)	San Joaquin
Annona cherimola (cherimoya)	Cladosporium sp. (fruit rot)	Santa Barbara
Araucaria bidwilli (bunya-bunya)	physiological oedema	Sacramento
Callistemon citrinus (bottle brush)	Seimatosporium dilophosphorum (leafspot)	Contra costa
Castanea dentata (American chestnut)	Armillaria mellea (oak root fungus)	Placer
Cercis occidentalis (western red bud)	Botrytis cinerea (foliar blight)	Yolo
Cornus sp. (dogwood)	Armillaria mellea (oak root fungus)	Placer
Cornus florida (pink flowering dogwood)	Armillaria mellea (oak root fungus)	Sonoma
Cryptomera japonica (cryptomera]	Botryosphaeria dothidea (branch canker)	Santa Barbara
Cryptomera japonica (cryptomera)	Phyllosticta cryptomeriae (foliar blight)	Santa Barbara

TABLE 6.2. (cont.)

HOST TREE	DIAGNOSIS	COUNTY
Eucalyptus sp. (eucalyptus)	Oidium sp. (powdery mildew)	Humboldt
Eucalyptus sp.	physiological oedema	Humboldt
Eucalyptus pulverulenta var. "Baby Blues" (silver dollar)	Macrophomina phaseolina (stem & hypocotyl rot)	Trinity
Liquidambar styraciflua (sweetgum)	Pseudomonas syringe (dieback)	Placer
Manonia aquifolia (Oregon grape)	Cumminsiella mirabilissima (rust)	Orange
Maytenus boaria (mayten)	Pestalotiopsis guepini (facultative canker) parasite)	Butte
Pinus lambertiana (sugar pine, 2-0 seedlings in storage)	Lophodermium pinastri (needle fungus)	Butte
Pinus radiata (Monterey pine)	Fusarium subglutinans (pitch canker)	San Luis Obispo
Pinus radiata (Christmas tree)	Cyclaneusma minus (Naemacyclus needlecast)	San Mateo
Populus trichocarpa (black cottonwood)	Taphrina populina (leaf blister)	Siskiyou
Prunus persida (peach)	Taphrina deformans (peach leaf curl)	Calaveras
Pseudotsuga menziesii (Douglas-fir)	Rhabdocline pseudotsugae (needle cast)	El Dorado
Pyrus kawakamii (ornamental pear)	Entomosporium mespili (leafspot)	Monterey, Santa Cruz
Quercus agrifolia (coast live oak)	Phytophthora cinnamomi (crown rot)	Sonoma
Quercus agrifolia	Sphaerotheca lanestris (powdery mildew)	Santa Cruz
Quercus coccinea (scarlet oak)	frost injury	Yolo

TABLE 6.2. (cont.)

HOST TREE	DIAGNOSIS	COUNTY
Quercus douglasii (blue oak)	Cytospora chrysosperma (canker)	Mendocino
Quercus douglasii	Ganoderma lucidum (decay fungus)	Sacramento
Quercus garyana (Oregon white oak)	Diplodia longispora (canker)	Mendocino
Quercus kelloggii (black oak)	Taphrina caerulescens (leaf blister)	Calaveras, Contra Costa
Salix babylonica (weeping willow)	Pleurotus ostreatus (wood decay)	Sacramento
Sequoia gigantea (giant sequoia)	Botryosphaeria dothidea (branch canker)	Sacramento
Sequoia gigantea	Macrophomina phaseolina (charcoal rot)	Butte
Sequoia sempervirens (coast redwood)	Fusicoccum aesculi (branch canker)	Sacramento, Santa Barbara
Taxus sp. (yew)	drowning injury	San Mateo
Ulmus americana (American elm)	Armillaria mellea (root rot)	Sacramento
Ulmus parvifolia (Chinese elm)	Asteroma ulmeum (black spot)	Humboldt, San Francisco
Umbellularia californica (bay laurel]	Ganoderma lucidum (decay fungus)	Sacramento
Umbellularia californica	Mycosphaerella arbuticola (leafspot)	Humboldt
Washingtonia robusta (Mexican fan palm)	Sphaerodothis neowashingtoniae (diamond leaf spot)	Sacramento
Yucca gloriosa (Spanish dagger)	Cladosporium macrocarpum (leafspot)	Sacramento, Solano, Sutter, Yolo

UNITED STATES DEPARTMENT OF AGRICULTURE - FOREST SERVICE

CALIFORNIA FOREST PEST COUNCIL

FOREST PEST DETECTION REPORT

I. FIELD INFORMATION (See instructions on reverse)

1. COUNTY:

2. FOREST (FS ONLY):

3. DISTRICT (FS ONLY):

4. LEGAL DESCRIPTION:
T. _____ R. _____
section (s) _____

5. DATE:

6. LOCATION:

7. LANDOWNERSHIP:
- FOREST SERVICE ☐
- OTHER FEDERAL ☐
- STATE ☐
- PRIVATE ☐

8. SUSPECTED CAUSE(S) OF INJURY:
- 1. INSECT ☐
- 2. DISEASE ☐
- 3. ANIMAL ☐
- 4. WEATHER ☐
- 5. CHEMICAL ☐
- 6. MECHANICAL ☐
- 7. WEED ☐
- 8. UNKNOWN ☐

9. SIZE(S) OF TREES AFFECTED:
- 1. SEEDLING ☐
- 2. SAPLING ☐
- 3. POLE ☐
- 4. SAWTIMBER ☐
- 5. OVERMATURE ☐

10. PART(S) OF TREE AFFECTED:
- 1. ROOT ☐
- 2. BRANCH ☐
- 3. LEADER ☐
- 4. BOLE ☐
- 5. TWIG ☐
- 6. FOLIAGE ☐
- 7. BUD ☐
- 8. CONE ☐

11. SPECIES AFFECTED:

12. NUMBER AFFECTED:

13. ACRES AFFECTED:

14. INJURY DISTRIBUTION:
1. SCATTERED ☐ 2. GROUPED ☐

15. STATUS OF INJURY:
1. DECREASING ☐ 2. STATIC ☐ 3. INCREASING ☐

16. ELEVATION:

17. PLANTATION?
1. YES ☐
2. NO ☐

18. STAND COMPOSITION (SPECIES):

19. STAND AGE AND SIZE CLASS:

20. STAND DENSITY (BASAL AREA):

21. SITE QUALITY:

22. PEST NAMES (IF KNOWN) AND REMARKS (SYMPTOMS AND CONTRIBUTING FACTORS):

23. SAMPLE FORWARDED?
1. YES ☐
2. NO ☐

24. ACTION REQUESTED:
1. INFORMATION ONLY ☐
2. LAB IDENTIFICATION ☐
3. FIELD EVALUATION ☐

25. REPORTER'S NAME:

26. REPORTER'S AGENCY:

27. REPORTER'S ADDRESS & PHONE NUMBER:

II. REPLY (PEST MANAGEMENT USE)

28. RESPONSE:

29. REPORT NUMBER:

30. DATE:

31. EXAMINER'S SIGNATURE:

R5 2400-1 (Rev. 3/90)

THE COOPERATIVE FOREST PEST DETECTION SURVEY is sponsored by the California Forest Pest Council. The Council encourages federal, state, and private land managers and individuals to contribute to the Survey by submitting pest injury reports and samples in the following manner.

FEDERAL PERSONNEL. Send all detection reports through channels. Mail injury samples with a copy of this report to one of the following appropriate offices:

USDA Forest Service
State and Private Forestry
630 Sansome Street
San Francisco, CA 94111

Forest Pest Management
Shasta-Trinity National Forests
2400 Washington Avenue
Redding, CA 96001

Forest Pest Management
Stanislaus National Forest
19777 Greenley Road
Sonora, CA 95370

STATE PERSONNEL. Send all detection reports through channels. Mail injury samples with a copy of this report to one of the following appropriate offices:

California Dept. of Forestry
and Fire Protection
P.O. Box 1590
Davis, CA 95617

California Dept. of Forestry
and Fire Protection
6105 Airport Road
Redding, CA 96002

California Dept. of Forestry
and Fire Protection
776 S. State Street, #107
Ukiah, CA 95482-5891

PRIVATE LAND MANAGERS AND INDIVIDUALS. Send all detection reports and samples to the closest California Department of Forestry and Fire Protection office listed above.

COMPLETING THE DETECTION REPORT FORM

HEADING (BLOCKS 1-7). Enter all information requested. In Block 6, LOCATION, provide sufficient information for the injury center to be relocated. If possible, attach a location map to this form.

INJURY DESCRIPTION (BLOCKS 8-15). Check as many boxes as are applicable, and fill in the requested information as completely as possible.

STAND DESCRIPTION (BLOCKS 16-21). This information will aid the examiner in determining how the stand conditions contributed to the pest situation. In Block 18, indicate the major tree species in the overstory and understory. In Block 19, indicate the stand age in years, and/or the size class (seedling-sapling; pole; young sawtimber; mature sawtimber; overmature, or decadent).

PEST NAMES (BLOCK 22). Write a detailed description of the pest or pests, the injury symptoms, and any contributing factors.

ACTION REQUESTED (BLOCK 24). Mark "Field Evaluation" only if you consider the injury serious enough to warrant a professional evaluation. Mark "Information Only" if you are reporting a condition that does not require further attention. All reports will be acknowledged and questions answered on the lower part of this form.

REPLY (SECTION II). Make no entries in this block; for examining personnel only. A copy of this report will be returned to you with the information requested.

HANDLING SAMPLES. Please submit injury samples with each detection report. If possible, send several specimens illustrating the stages of injury and decline. Keep samples cool and ship them immediately after collection. Send them in a sturdy container, and enclose a completed copy of the detection report.

YOUR PARTICIPATION IN THE COOPERATIVE FOREST PEST DETECTION SURVEY IS GREATLY NEEDED AND APPRECIATED. Additional copies of this form are available from the Forest Service, Forest Pest Management, and from the California Department of Forestry and Fire Protection.

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